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ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-4) LAUNCH

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16. ABSTRACT <p>This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-4 launch time on June 27, 1982, at Kennedy Space Center, Florida. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch Jimsphere measured vertical wind profiles is given in this report. Also presented are the wind and thermodynamic parameters measured at the surface and aloft in the SRB descent/impact ocean area. Final meteorological tapes, which consist of wind and thermodynamic parameters versus altitude, for STS-4 vehicle ascent and SRB descent have been constructed. The STS-4 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 989-13-22 368 with Johnson Space Center.</p>			
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TECHNICAL MEMORANDUM

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-4) LAUNCH

I. INTRODUCTION

This report presents an evaluation of the atmospheric environmental data taken during the launch of the Space Shuttle/STS-4 vehicle. This Space Shuttle vehicle was launched from Pad 39A at Kennedy Space Center (KSC), Florida, on a bearing of 90 degrees east of north at 1500 GMT (1100 EDT) on June 27, 1982.

This report presents a summary of the atmospheric environment at launch time (L+0) of the STS-4, together with the sequence of prelaunch Jimsphere measured winds aloft profiles from L-14 hr through liftoff. The general weather situation for the launch and flight area is described, and surface and upper level wind/thermodynamic observations near launch time are given. Surface and upper level wind/thermodynamic parameter measurements are also presented for the SRB descent/impact analyses.

Previous MSFC-related launch vehicle atmospheric environmental conditions have been published as Appendix A of individual MSFC Saturn Flight Evaluation Working Group reports [1]. Office memorandums have been issued for previous flights giving launch pad wind information. A report has also been published [2] which summarizes most launch atmospheric conditions observed for the past 155 MSFC/ABMA-related vehicle launches through SA-208 (Skylab 4). Reports summarizing ASTP, STS-1, STS-2, and STS-3 launch conditions are presented in References 3, 4, 5, and 6, respectively.

II. SOURCES OF DATA

Atmospheric observational data used in this report were taken from weather maps made by the National Weather Service, plus all available surface observations and measurements from around the launch area. Upper air observations were taken from balloon-released instruments sent aloft from Cape Canaveral Air Force Station (CCAFS) and from the ship Gen. H. S. Vandenberg in the Atlantic Ocean off the Florida Coast. High-altitude winds and thermodynamic data were measured by the Loki and Super-Loki rocketsondes launched from the CCAFS. Table 1 presents a listing of systems used to obtain the upper level wind profiles used in compiling the final ascent meteorological data tape. Only the ship-launched Omegasonde-Rawinsonde and Loki/Super-Loki rocket data were used in the upper level atmospheric regions for the construction of the final SRB descent/impact meteorological data tape. Data cutoff altitudes are also given in Table 1.

III. GENERAL SYNOPTIC SITUATION AT LAUNCH TIME

An area of high pressure located in the Atlantic ocean off the southeastern United States coast, extended its influence over the Florida peninsula during the morning of launch. Surface winds in the KSC launch area were light (5 to 6 ft/sec) and from the southeast. Very little cloud cover, warm temperatures (low 70s °F), and humid conditions prevailed throughout the early morning countdown period. Figure 1 gives the surface weather map 3 hr prior to launch. Figure 2 presents the wind flow aloft at the 500 mb level. Light westerly winds dominated the flow aloft over the Florida KSC area.

Cloudiness was not very prevalent over the Florida peninsula or the KSC launch complex as shown in Figure 3. Figure 3 presents the GOES east (SMS II) visible satellite picture taken 30 min after launch (1530 GMT). Scattered cumulus clouds at 1200 ft were present during launch. Figure 4 shows the contrail of the Shuttle at launch as recorded by the GOES east satellites visible photograph taken at 1503 GMT.

IV. SURFACE OBSERVATIONS AT LAUNCH TIME

Surface observations at launch time for selected KSC locations are given in Table 2. Included are pad 39A, Shuttle runway, and CCAFS balloon release station observations. Neither precipitation nor lightning was observed at launch time.

Table 3 presents Pad 39A wind data along with other standard hourly meteorological measurements and sky observations for the 6-hr period prior to launch of STS-4. Values for wind speed and direction are given for the 84 m (275 ft) FSS reference level and 18 m (60 ft) pad light pole level.

V. UPPER AIR MEASUREMENTS DURING LAUNCH

The FPS 16 Jimsphere (1515 GMT), MSS rawinsonde (1510 GMT), Loki-Dart rocketsonde (1730 GMT), and Super-Loki rocketsonde (1630 GMT) systems were used to measure the upper level wind and thermodynamic parameters for STS-4 launch. At altitudes above the rocket-measured data, the Global Reference Atmosphere (GRA) [7] parameters for June KSC conditions were used. A tabulation of the STS-4 final meteorological data for ascent is presented in Table 4 which lists the wind and thermodynamic parameters versus altitude. A brief summary of parameters is given in the following paragraphs.

A. Wind Speed

At launch time, wind speeds were 5.8 ft/sec (3.4 kn) at 60 ft and increased to a maximum of 37 ft/sec (22 kn) blowing from 329 degrees. This maximum occurred at an altitude of 47,900 ft (14,600 m). The winds decreased above this level and then became stronger again at much higher levels, as shown in Figure 5. The overall maximum measured speed was 241 ft/sec (143 kn) at 216,000 ft (65,837 m) altitude.

B. Wind Direction

At launch time, the 60-ft wind direction was from the southeast (133 degrees) and shifted through the south to a westerly component above 5500 ft (1676 m). The winds then shifted into the summer-easterly regime between 57,000 ft (17,374 m) and 235,000 ft (71,628 m). Figure 5 shows the complete wind direction versus altitude profile. As shown in Figure 5, wind directions became quite variable at altitudes with low wind speeds.

C. Prelaunch/Launch Wind Profiles

Prelaunch/launch wind profiles presented in Figures 6 through 9 were measured by the Jimsphere FPS-16 system. Data are shown for five measurement periods beginning at L-14 hr and extending through L+0.

The wind speed profiles for the 14-hr period prior to and including L+0 are shown in Figure 6. These values were near the June mean profile at altitude levels above 30,000 ft but were somewhat greater than the mean wind speeds below this altitude. As an illustration of the departure from normal the L+0 measured wind speed at 20,000-ft altitude was 28 ft/sec compared to the June mean at this altitude of 10 ft/sec.

The wind directions are presented in Figure 7 for this same 14-hr prelaunch/launch period. These profiles did not differ greatly from the June mean values, especially at altitude levels below about 30,000 ft. However, above 30,000 ft, the measured wind direction did not closely coincide with the mean. For example, at 36,000-ft altitude the mean June wind direction was about 280 degrees while the L+0 value was measured as being 013 degrees or a departure of about 93 degrees from the June mean.

The in-plane and out-of-plane wind speed profile values are shown in Figures 8 and 9, respectively. Although some variation about the June mean occurred especially with respect to the in-plane wind speeds, the L+0 values were close to the June mean values.

D. Thermodynamic Data

The thermodynamic data taken at STS-4 launch time, consisting of atmospheric temperature, dew-point temperature, pressure, and density have been compiled as the STS-4 ascent meteorological data and are presented in Table 4. The associated thermodynamic data taken in support of the SRB descent have also been assembled as the STS-4 SRB descent/impact meteorological data and are presented in Table 5. The vertical structure of temperature for the STS-4 ascent and for the SRB descent is shown graphically versus altitude in Figure 10.

The atmospheric thermodynamic parameters of temperature, pressure, and density, measured during STS-4 launch below 140,000 ft, were generally close to their respective PRA-63 [8] annual values. Temperature deviated only a maximum of +2.6 percent from the PRA-63 at 95,000 ft (28,956 m). Pressure deviated a maximum of +6.4 percent from the PRA-63 at 94,000 ft (28,651 m), while density deviated +7.5 percent at 110,000 ft (33,528 m).

E. SRB Upper Air and Surface Measurements

As has been mentioned in earlier paragraphs, an SRB descent meteorological data tape has also been constructed which consists of data taken from the Omega-sonde-Rawinsonde system (1539 GMT) aboard the USNS Vandenberg, which was stationed off the coast in the Atlantic Ocean. The CCAFS measured Loki/Super-Loki rocketsonde data and the GRA model data were used at altitude levels above the measured Omegasonde data. The tabular values for the SRB descent meteorological tape are presented in Table 5, with wind speed and direction profiles presented in Figure 11. Figure 10 gives the vertical temperature profile.

The surface-ship meteorological and oceanographical observations taken close to STS-4 SRB impact are presented in Table 6.

VI. ATMOSPHERIC SUMMARY CONDITIONS FOR STS LAUNCHES

Given in Table 7 are selected atmospheric L+0 launch conditions for all the Space Shuttle launches.

TABLE 1. SYSTEMS USED TO MEASURE UPPER AIR WIND
DATA FOR STS-4 ASCENT*

Type of Data	Date: June 27, 1982		Portion of Data Used			
	Release Time		Start		End	
	Time (GMT) (hr:min)	Time After T+0 (min)	Altitude m (ft)	Time After T+0 (min)	Altitude m (ft)	Time After T+0 (min)
FPS 16 Jimsphere	15:15	15	6 (21)	15	16,764 (55,000)	73
Rawinsonde	15:10	10	17,069 (56,000)	66	28,956 (95,000)	105
Loki Dart Rocketsonde	17:30	150	68,580 (225,000)	150	29,261 (96,000)	170
Super Loki Rocketsonde (Robin)	16:30	90	82,296 (270,000)	90	68,885 (226,000)	91
Omegasonde Rawinsonde*	15:39	39	18 (60)	39	28,346 (93,000)	132

*The Omegasonde Rawinsonde was released from the USNS Gen. H. S. Vandenberg to measure the upper atmosphere for SRB descent/impact analyses.

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TABLE 2. SURFACE OBSERVATIONS AT STS-4 LAUNCH TIME

Location ^a	Time After L+0 (min)	Pressure (MSL) N/cm ² (psia)	Temperature °K (°F)	Dew Point °K (°F)	Relative Humidity (%)	Visibility km (miles)	Sky Cover			Wind	
							Cloud*** Amount (Tenths)	Cloud Type	Height of Base Meters (ft)	Speed f/sec (kt)	Direction (deg)
NASA Space Shuttle Runway	0	10.207 (14.804)	299.6 (85.0)	297.0 (75.0)	72	16 (10)	2	Cumulus	366 (1,200)	8.4 (5.0)	260
Winds Measured at 10.4 m (34 ft)											
CCAFS ^c	10	10.210 [*] (14.808)	302.0 (84.0)	297.9 (76.0)	78	—	—	—	—	12.0 (7.1)	160
Surface Measurements											
Pad 39A lightpole ^d	0	10.200** (14.794)	302.3 (84.4)	296.3 (73.6)	70	—	—	—	—	5.8 ^b (3.4)	160
SE 18.3 m (60.0 ft)											
Pad 39A FSS (Top-SE) 83.8 m (275 ft)	0	—	—	—	—	—	—	—	—	4.9 ^b (2.9)	160

* Pressure value at 13 ft above MSL.

** Pad 39A Camera Site 3 barometric pressure instrument appeared to be reading too low. Therefore, the KSC Shuttle runway station pressure value interpolated to 10.200 N/cm² at 21 ft above MSL would be more appropriate as the L+0 pad atmospheric pressure measurement.

*** Two-tenths total sky cover.

a. Altitudes of measurements are above natural grade, except where noted.

b. Approximately 30 sec average prior to L+0.

c. Balloon release site.

d. Pad 39A thermodynamic measurements are taken at camera site No. 3, approximately 6.4 m (21 ft) above MSL.

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TABLE 3. STS-4 PRE-LAUNCH THROUGH LAUNCH KSC PAD 39A
METEOROLOGICAL MEASUREMENTS*

27 June 1982 Time GMT	Hourly Atmospheric Measurements						Sky Condition			
	Temp. (°F)	Dew Pt. (°F)	RH (%)	275' Level (SE)**		60' Level (SE)**	Clouds	Total Sky Cover	Vis. (mi.)	Other Remarks
				WS	Kt	WD°				
0900	75	72	90	6		090	Clear Skys	0/10	10	Patches ground fog
1000	78	75	91	7		130	Clear Skys	0/10	10	Patches ground fog
1100	76	73	91	5		100	1/10 AC at 16,000 ft	1/10	10	Patches ground fog dissipating
1200	78	75	91	7		110	Clear Skys	0/10	10	
1300	80	74	83	9		150	Clear Skys	0/10	10	
1400	82	74	78	10		170	1/10 CU at 1,100 ft	1/10	10	
L+0*** 1500	84	74	70	3		141	2/10 CU at 1,200 ft	2/10	10	

* Hourly observations obtained verbally from CCAFS.

** 10 min mean about the hour from pad 39A instrumentation.

*** L+0 PAD Wind and thermodynamic parameters obtained from HOSC strip charts. SE Anemometers used at 60 and 275 ft levels for L+0 wind conditions (approximately 30 sec average prior to L+0). PAD 39A L+0 atmospheric pressure, at 21 ft (MSL), was 10.200 N/cm². Sea level pressure was 10.207 N/cm².

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TABLE 4. STS-4 FINAL T+0 ASCENT METEOROLOGICAL DATA TAPE

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	L. W. POINT (DEG C)
00021	010	150	28.9	.1020+04	.1164+04	22.8
00060	010	154	28.7	.1017+04	.1162+04	22.7
00070	009	159	28.4	.1014+04	.1159+04	22.6
00330	009	163	28.2	.1011+04	.1156+04	22.5
00400	009	168	27.9	.1007+04	.1153+04	22.5
00450	009	173	27.7	.1004+04	.1151+04	22.4
00460	009	178	27.4	.1000+04	.1148+04	22.3
00370	009	183	27.2	.9971+03	.1145+04	22.2
00480	009	187	26.9	.9938+03	.1142+04	22.1
00500	010	192	26.7	.9905+03	.1139+04	22.0
001000	010	196	26.4	.9872+03	.1137+04	21.9
001100	010	200	26.2	.9838+03	.1134+04	21.7
001200	011	204	26.0	.9804+03	.1131+04	21.4
001300	011	207	25.8	.9771+03	.1128+04	21.2
001400	011	211	25.6	.9737+03	.1125+04	20.9
001500	012	214	25.4	.9703+03	.1122+04	20.7
001600	012	216	25.1	.9670+03	.1119+04	20.5
001700	013	219	24.9	.9637+03	.1116+04	20.2
001800	013	215	24.7	.9604+03	.1113+04	20.0
001900	014	206	24.5	.9571+03	.1110+04	19.7
002000	011	205	24.3	.9538+03	.1107+04	19.5
002100	012	225	24.1	.9504+03	.1104+04	19.2
002200	011	215	23.9	.9472+03	.1101+04	18.9
002300	010	211	23.6	.9439+03	.1098+04	18.7
002400	006	210	23.4	.9406+03	.1095+04	18.4
002500	009	207	23.2	.9373+03	.1093+04	18.1
002600	012	208	23.0	.9341+03	.1090+04	17.8
002700	010	200	22.8	.9308+03	.1087+04	17.5
002800	006	214	22.5	.9276+03	.1084+04	17.3
002900	006	231	22.3	.9244+03	.1081+04	17.0
003000	010	223	22.1	.9212+03	.1078+04	16.7
003100	006	202	21.9	.9179+03	.1075+04	16.6
003200	005	210	21.7	.9147+03	.1072+04	16.4
003300	007	242	21.5	.9115+03	.1069+04	16.3
003400	008	235	21.3	.9084+03	.1066+04	16.2
003500	006	228	21.1	.9052+03	.1063+04	16.0
003600	004	228	20.9	.9020+03	.1061+04	15.9
003700	005	245	20.7	.8989+03	.1058+04	15.8
003800	009	245	20.5	.8957+03	.1055+04	15.7
003900	010	236	20.3	.8926+03	.1052+04	15.5
004000	008	227	20.1	.8895+03	.1049+04	15.4
004100	009	240	19.9	.8863+03	.1046+04	15.2
004200	012	245	19.7	.8832+03	.1043+04	14.9
004300	012	241	19.4	.8801+03	.1040+04	14.7
004400	009	240	19.2	.8770+03	.1038+04	14.4
004500	009	258	19.0	.8739+03	.1035+04	14.2
004600	009	247	18.8	.8708+03	.1032+04	14.0
004700	009	228	18.6	.8677+03	.1029+04	13.7
004800	007	22	18.3	.8647+03	.1026+04	13.5
004900	008	246	18.1	.8616+03	.1024+04	13.2

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TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/CM ³)	DEW POINT (DEG C)
00900	006	243	17.9	.8586+03	.1021+04	11.0
00900	006	242	17.7	.8556+03	.1018+04	12.7
00900	006	254	17.6	.8525+03	.1015+04	12.4
00900	007	257	17.4	.8495+03	.1012+04	12.0
00900	006	279	17.3	.8465+03	.1009+04	11.7
00900	007	283	17.1	.8435+03	.1006+04	11.4
00900	005	252	16.9	.8405+03	.1003+04	11.1
00900	003	274	16.8	.8375+03	.1000+04	10.8
00900	007	266	16.6	.8345+03	.9975+03	10.4
00900	006	254	16.5	.8316+03	.9946+03	10.1
00900	006	273	16.3	.8286+03	.9917+03	9.8
00900	009	257	16.1	.8256+03	.9890+03	9.5
00900	008	257	15.9	.8227+03	.9864+03	9.2
00900	006	270	15.6	.8198+03	.9837+03	8.8
00900	009	260	15.4	.8168+03	.9810+03	8.5
00900	008	257	15.2	.8139+03	.9783+03	8.2
00900	008	277	15.0	.8110+03	.9757+03	7.9
00900	010	271	14.8	.8081+03	.9730+03	7.6
00900	008	265	14.5	.8052+03	.9704+03	7.2
00900	006	269	14.3	.8023+03	.9677+03	6.9
00900	007	295	14.1	.7994+03	.9651+03	6.6
00900	006	267	13.9	.7966+03	.9623+03	6.4
00900	006	257	13.7	.7937+03	.9596+03	6.2
00900	005	257	13.5	.7908+03	.9569+03	5.9
00900	003	241	13.3	.7879+03	.9542+03	5.7
00900	004	270	13.1	.7851+03	.9515+03	5.5
00900	006	300	12.8	.7823+03	.9488+03	5.3
00900	007	262	12.6	.7794+03	.9461+03	5.1
00900	005	253	12.4	.7766+03	.9434+03	4.8
00900	004	237	12.2	.7738+03	.9407+03	4.6
00900	005	269	12.0	.7710+03	.9381+03	4.2
00900	009	283	11.8	.7682+03	.9353+03	4.0
00900	007	265	11.6	.7654+03	.9325+03	3.6
00900	006	240	11.5	.7627+03	.9298+03	3.5
00900	005	234	11.3	.7599+03	.9270+03	3.3
00900	006	244	11.1	.7571+03	.9243+03	3.1
00900	008	244	10.9	.7544+03	.9216+03	2.9
00900	008	225	10.7	.7517+03	.9188+03	2.7
00900	006	234	10.6	.7489+03	.9161+03	2.5
00900	009	263	10.4	.7462+03	.9134+03	2.2
00900	009	264	10.2	.7435+03	.9107+03	2.0
00900	009	250	10.0	.7408+03	.9080+03	1.9
00900	009	262	9.8	.7381+03	.9053+03	1.7
00900	011	257	9.7	.7354+03	.9026+03	1.6
00900	009	234	9.5	.7327+03	.8999+03	1.5
00900	011	243	9.3	.7300+03	.8972+03	1.3
00900	014	254	9.1	.7274+03	.8945+03	1.2
00900	010	235	8.9	.7247+03	.8918+03	1.1
00900	011	244	8.8	.7221+03	.8891+03	1.0
00900	011	255	8.6	.7194+03	.8865+03	0.9

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
01000	015	258	8.5	.7168+03	.8935+03	1.0
01100	012	256	8.2	.7192+03	.8912+03	.7
01200	013	256	8.1	.7115+03	.8785+03	.8
01300	015	255	7.9	.7089+03	.8758+03	.2
01400	016	250	7.7	.7063+03	.8732+03	-1.1
01500	018	250	7.6	.7037+03	.8706+03	-2.4
01600	016	255	7.5	.7011+03	.8679+03	-2.7
01700	016	254	7.2	.6985+03	.8653+03	-1.0
01800	018	257	7.0	.6960+03	.8627+03	-1.2
01900	018	251	6.9	.6934+03	.8601+03	-1.5
02000	019	255	6.7	.6909+03	.8575+03	-1.8
02100	018	250	6.5	.6883+03	.8549+03	-1.9
02200	017	259	6.2	.6858+03	.8523+03	-1.9
02300	017	256	6.1	.6832+03	.8497+03	-2.0
02400	016	252	5.9	.6807+03	.8472+03	-2.1
02500	019	266	5.7	.6782+03	.8446+03	-2.1
02600	017	273	5.6	.6756+03	.8421+03	-2.2
02700	016	271	5.4	.6731+03	.8395+03	-2.3
02800	023	275	5.2	.6706+03	.8370+03	-2.4
02900	019	282	5.0	.6682+03	.8344+03	-2.4
03000	018	273	4.8	.6657+03	.8319+03	-2.5
03100	020	271	4.6	.6632+03	.8293+03	-2.7
03200	019	272	4.5	.6607+03	.8267+03	-2.9
03300	024	261	4.3	.6583+03	.8241+03	-3.1
03400	022	267	4.2	.6558+03	.8215+03	-3.3
03500	024	270	4.0	.6534+03	.8189+03	-3.4
03600	021	274	3.9	.6509+03	.8163+03	-3.4
03700	021	284	3.8	.6485+03	.8137+03	-3.8
03800	021	280	3.6	.6461+03	.8111+03	-4.0
03900	022	279	3.4	.6437+03	.8086+03	-4.2
04000	021	278	3.3	.6413+03	.8060+03	-4.4
04100	020	270	3.2	.6389+03	.8033+03	-4.4
04200	019	271	3.1	.6365+03	.8006+03	-4.4
04300	019	266	3.0	.6341+03	.7979+03	-4.5
04400	022	265	2.9	.6317+03	.7952+03	-4.5
04500	022	273	2.7	.6294+03	.7926+03	-4.5
04600	023	267	2.6	.6270+03	.7899+03	-4.5
04700	020	268	2.5	.6247+03	.7873+03	-4.5
04800	021	273	2.4	.6223+03	.7846+03	-4.6
04900	025	264	2.3	.6200+03	.7820+03	-4.6
05000	021	267	2.2	.6177+03	.7794+03	-4.6
05100	022	272	2.0	.6153+03	.7771+03	-5.1
05200	024	266	1.8	.6130+03	.7748+03	-5.6
05300	020	271	1.6	.6107+03	.7726+03	-6.1
05400	019	273	1.4	.6084+03	.7703+03	-6.6
05500	022	271	1.2	.6061+03	.7681+03	-7.1
05600	019	269	.9	.6038+03	.7658+03	-7.6
05700	021	276	.7	.6016+03	.7636+03	-8.1
05800	021	267	.5	.5993+03	.7613+03	-8.6
05900	024	263	.3	.5970+03	.7591+03	-9.1

ORIGINAL PAGE IS
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TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
015000	023	270	-1	.5948+03	.7569+03	-9.6
015100	026	262	-1	.5925+03	.7545+03	-10.0
015200	024	257	-2	.5903+03	.7521+03	-10.3
015300	029	254	-4	.5880+03	.7498+03	-10.7
015400	026	254	-6	.5858+03	.7474+03	-11.1
015500	026	254	-7	.5836+03	.7451+03	-11.4
015600	026	251	-9	.5814+03	.7428+03	-11.8
015700	025	257	-11	.5792+03	.7404+03	-12.2
015800	026	264	-13	.5770+03	.7381+03	-12.6
015900	026	260	-14	.5748+03	.7358+03	-12.9
016000	027	254	-16	.5726+03	.7335+03	-13.3
016100	024	263	-18	.5704+03	.7312+03	-13.5
016200	026	264	-20	.5682+03	.7290+03	-13.6
016300	025	257	-22	.5661+03	.7268+03	-13.6
016400	029	254	-24	.5639+03	.7245+03	-14.0
016500	026	256	-26	.5617+03	.7223+03	-14.1
016600	027	257	-26	.5596+03	.7201+03	-14.3
016700	026	253	-30	.5574+03	.7179+03	-14.5
016800	026	264	-32	.5553+03	.7157+03	-14.7
016900	026	265	-34	.5532+03	.7135+03	-14.8
017000	029	261	-36	.5511+03	.7113+03	-15.0
017100	026	263	-38	.5490+03	.7091+03	-15.3
017200	025	274	-40	.5468+03	.7070+03	-15.6
017300	026	269	-43	.5447+03	.7049+03	-16.0
017400	023	263	-45	.5426+03	.7028+03	-16.3
017500	020	271	-47	.5405+03	.7006+03	-16.6
017600	022	271	-49	.5385+03	.6985+03	-16.9
017700	020	256	-51	.5364+03	.6964+03	-17.2
017800	024	251	-54	.5343+03	.6943+03	-17.6
017900	021	254	-56	.5323+03	.6922+03	-17.9
018000	025	256	-58	.5302+03	.6902+03	-18.2
018100	027	245	-60	.5282+03	.6880+03	-18.5
018200	023	249	-62	.5261+03	.6858+03	-18.9
018300	027	248	-63	.5241+03	.6836+03	-19.2
018400	025	239	-65	.5220+03	.6814+03	-19.5
018500	029	236	-67	.5200+03	.6792+03	-19.8
018600	026	247	-69	.5180+03	.6771+03	-20.2
018700	029	247	-71	.5160+03	.6749+03	-20.5
018800	027	240	-72	.5140+03	.6728+03	-20.8
018900	026	244	-74	.5120+03	.6706+03	-21.2
019000	032	251	-76	.5100+03	.6685+03	-21.5
019100	033	247	-77	.5080+03	.6661+03	-22.3
019200	031	250	-77	.5060+03	.6637+03	-23.2
019300	032	256	-78	.5040+03	.6613+03	-24.0
019400	030	250	-79	.5021+03	.6589+03	-24.8
019500	034	256	-79	.5001+03	.6566+03	-25.6
019600	028	256	-80	.4982+03	.6542+03	-26.5
019700	030	252	-81	.4962+03	.6519+03	-27.3
019800	026	259	-82	.4943+03	.6495+03	-28.1
019900	030	258	-82	.4924+03	.6472+03	-29.0

ORIGINAL PAGE IS
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TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG C)
22000	026	254	-8.3	.6508+03	.6488+03	-29.8
22100	029	255	-8.5	.685+03	.6427+03	-30.1
22200	033	247	-8.6	.666+03	.6806+03	-30.4
22300	034	250	-8.8	.687+03	.6385+03	-30.6
22400	032	256	-9.0	.6828+03	.6384+03	-30.9
22500	035	252	-9.1	.6809+03	.6344+03	-31.2
22600	030	254	-9.3	.6790+03	.6323+03	-31.5
22700	034	256	-9.5	.6771+03	.6302+03	-31.8
22800	034	253	-9.7	.6753+03	.6282+03	-32.0
22900	030	253	-9.6	.6734+03	.6261+03	-32.3
23000	031	254	-10.0	.6715+03	.6241+03	-32.6
23100	028	255	-10.2	.6697+03	.6221+03	-32.0
23200	029	252	-10.4	.6678+03	.6202+03	-31.3
23300	031	250	-10.7	.6660+03	.6182+03	-30.7
23400	026	243	-10.9	.6641+03	.6163+03	-30.0
23500	027	244	-11.1	.6623+03	.6143+03	-29.3
23600	026	250	-11.3	.6605+03	.6124+03	-28.7
23700	024	244	-11.5	.6587+03	.6105+03	-28.1
23800	023	251	-11.8	.6568+03	.6086+03	-27.4
23900	021	255	-12.0	.6551+03	.6067+03	-26.7
24000	020	249	-12.2	.6533+03	.6047+03	-26.1
24100	020	260	-12.4	.6515+03	.6028+03	-26.2
24200	021	260	-12.6	.6497+03	.6009+02	-26.3
24300	020	251	-12.8	.6479+03	.5990+03	-26.5
24400	020	253	-13.0	.6461+03	.5971+03	-26.6
24500	021	254	-13.2	.6443+03	.5952+03	-26.7
24600	021	254	-13.5	.6425+03	.5933+03	-26.8
24700	022	265	-13.7	.6408+03	.5914+03	-26.9
24800	021	262	-13.9	.6390+03	.5896+03	-27.1
24900	022	257	-14.1	.6373+03	.5877+03	-27.2
25000	023	256	-14.3	.6356+03	.5858+03	-27.3
25100	024	261	-14.5	.6338+03	.5840+03	-27.4
25200	020	255	-14.7	.6321+03	.5821+03	-27.5
25300	025	254	-14.9	.6303+03	.5802+03	-27.5
25400	022	259	-15.1	.6286+03	.5784+03	-27.6
25500	022	258	-15.3	.6269+03	.5765+03	-27.7
25600	024	254	-15.6	.6252+03	.5747+03	-27.8
25700	019	265	-15.8	.6235+03	.5729+03	-27.9
25800	024	266	-16.0	.6218+03	.5710+03	-27.9
25900	023	263	-16.2	.6201+03	.5692+03	-28.0
26000	020	262	-16.4	.6184+03	.5674+03	-28.1
26100	019	259	-16.6	.6167+03	.5656+03	-27.7
26200	021	259	-16.7	.6150+03	.5635+03	-27.6
26300	017	261	-16.9	.6133+03	.5615+03	-27.0
26400	020	256	-17.0	.6117+02	.5596+03	-26.7
26500	019	265	-17.2	.6100+03	.5577+03	-26.3
26600	016	262	-17.4	.6083+03	.5558+03	-25.9
26700	024	251	-17.5	.6067+03	.5539+03	-25.4
26800	019	257	-17.7	.6051+03	.5519+03	-25.2
26900	016	243	-17.8	.6034+03	.5500+03	-24.9

ORIGINAL PAGE IS
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TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
025000	019	230	-18.0	.4018+03	.5481+03	-24.5
025100	014	234	-18.2	.4002+03	.5463+03	-25.1
025200	017	231	-18.4	.3985+03	.5446+03	-25.7
025300	014	231	-18.6	.3969+03	.5428+03	-26.2
025400	013	236	-18.8	.3953+03	.5410+03	-26.8
025500	015	234	-18.9	.3937+03	.5392+03	-27.4
025600	014	226	-19.1	.3921+03	.5374+03	-28.0
025700	014	244	-19.3	.3905+03	.5357+03	-28.6
025800	015	246	-19.5	.3889+03	.5339+03	-29.1
025900	010	247	-19.7	.3873+03	.5321+03	-29.7
026000	015	272	-19.9	.3857+03	.5304+03	-30.3
026100	017	266	-20.2	.3842+03	.5288+03	-30.2
026200	014	264	-20.4	.3826+03	.5272+03	-30.1
026300	016	259	-20.7	.3810+03	.5255+03	-29.9
026400	011	269	-21.0	.3795+03	.5239+03	-29.8
026500	013	256	-21.2	.3779+03	.5224+03	-29.7
026600	015	252	-21.5	.3763+03	.5208+03	-29.6
026700	011	252	-21.8	.3748+03	.5192+03	-29.5
026800	012	252	-22.1	.3733+03	.5176+03	-29.3
026900	013	241	-22.3	.3717+03	.5160+03	-29.2
027000	010	245	-22.6	.3702+03	.5145+03	-29.1
027100	012	249	-22.8	.3687+03	.5128+03	-29.5
027200	011	257	-23.0	.3671+03	.5111+03	-29.8
027300	011	264	-23.2	.3656+03	.5094+03	-30.2
027400	012	274	-23.4	.3641+03	.5077+03	-30.5
027500	013	265	-23.6	.3626+03	.5060+03	-30.9
027600	011	281	-23.9	.3611+03	.5044+03	-31.3
027700	016	267	-24.1	.3596+03	.5027+03	-31.6
027800	013	257	-24.3	.3581+03	.5011+03	-32.0
027900	015	271	-24.5	.3566+03	.4994+03	-32.3
028000	015	260	-24.7	.3552+03	.4978+03	-32.7
028100	014	272	-24.9	.3537+03	.4961+03	-33.0
028200	016	271	-25.1	.3522+03	.4945+03	-33.3
028300	016	266	-25.3	.3507+03	.4928+03	-33.5
028400	011	268	-25.5	.3492+03	.4912+03	-33.8
028500	017	269	-25.7	.3478+03	.4895+03	-34.1
028600	014	266	-26.0	.3463+03	.4879+03	-34.4
028700	016	267	-26.2	.3449+03	.4863+03	-34.7
028800	011	277	-26.4	.3434+03	.4847+03	-34.9
028900	016	259	-26.6	.3420+03	.4831+03	-35.2
029000	013	266	-26.8	.3406+03	.4815+03	-35.5
029100	009	274	-27.0	.3391+03	.4799+03	-35.7
029200	010	271	-27.3	.3377+03	.4783+03	-36.0
029300	013	273	-27.5	.3363+03	.4767+03	-36.2
029400	007	266	-27.7	.3349+03	.4752+03	-36.5
029500	006	297	-27.9	.3335+03	.4736+03	-36.7
029600	010	280	-28.2	.3321+03	.4721+03	-37.0
029700	007	292	-28.4	.3307+03	.4705+03	-37.2
029800	004	290	-28.6	.3293+03	.4690+03	-37.5
029900	009	290	-28.9	.3279+03	.4675+03	-37.7

ORIGINAL PAGE IS
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TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/CM ³)	DEW POINT (DEG C)
33000	310	263	-29.1	.3265+03	.4659+03	-36.0
33100	310	268	-29.3	.3251+03	.4644+03	-38.4
33200	310	264	-29.6	.3237+03	.4629+03	-38.9
33300	310	255	-29.8	.3223+03	.4614+03	-39.3
33400	311	250	-30.1	.3210+03	.4599+03	-39.6
33500	311	255	-30.3	.3196+03	.4584+03	-40.2
33600	311	251	-30.5	.3182+03	.4569+03	-40.7
33700	311	256	-30.6	.3169+03	.4554+03	-41.1
33800	311	268	-31.0	.3155+03	.4539+03	-41.6
33900	311	266	-31.3	.3142+03	.4524+03	-42.0
34000	310	251	-31.5	.3129+03	.4509+03	-42.5
34100	310	248	-31.6	.3115+03	.4495+03	-42.8
34200	310	243	-32.0	.3102+03	.4480+03	-43.0
34300	306	235	-32.3	.3088+03	.4466+03	-43.3
34400	309	243	-32.5	.3075+03	.4452+03	-43.5
34500	309	246	-32.8	.3062+03	.4437+03	-43.6
34600	307	241	-33.1	.3049+03	.4423+03	-44.1
34700	307	238	-33.3	.3036+03	.4409+03	-44.3
34800	307	239	-33.6	.3023+03	.4395+03	-44.6
34900	306	226	-33.6	.3010+03	.4381+03	-44.8
35000	303	217	-34.1	.2997+03	.4367+03	-45.1
35100	303	197	-34.3	.2984+03	.4352+03	-45.4
35200	303	222	-34.6	.2971+03	.4337+03	-45.7
35300	304	257	-34.8	.2958+03	.4322+03	-46.1
35400	306	256	-35.0	.2945+03	.4308+03	-46.4
35500	305	265	-35.2	.2932+03	.4293+03	-46.7
35600	304	261	-35.5	.2919+03	.4279+03	-47.0
35700	303	272	-35.7	.2907+03	.4264+03	-47.3
35800	306	266	-35.9	.2894+03	.4250+03	-47.7
35900	304	270	-36.2	.2882+03	.4235+03	-48.0
36000	302	241	-36.4	.2869+03	.4221+03	-48.3
36100	302	295	-36.7	.2856+03	.4208+03	-48.5
36200	304	265	-37.0	.2844+03	.4195+03	-48.7
36300	302	259	-37.3	.2831+03	.4181+03	-49.0
36400	303	319	-37.6	.2819+03	.4168+03	-49.2
36500	305	277	-37.8	.2807+03	.4155+03	-49.4
36600	304	267	-38.1	.2794+03	.4142+03	-49.6
36700	305	317	-38.4	.2782+03	.4129+03	-49.8
36800	307	297	-38.7	.2770+03	.4116+03	-50.1
36900	305	298	-39.0	.2758+03	.4103+03	-50.3
37000	307	316	-39.3	.2746+03	.4090+03	-50.5
37100	309	315	-39.5	.2733+03	.4076+03	-50.7
37200	310	323	-39.8	.2721+03	.4062+03	-50.9
37300	311	324	-40.0	.2709+03	.4048+03	-51.1
37400	312	328	-40.3	.2697+03	.4035+03	-51.3
37500	313	329	-40.5	.2685+03	.4021+03	-51.4
37600	313	338	-40.8	.2673+03	.4008+03	-51.6
37700	312	345	-41.0	.2661+03	.3994+03	-51.8
37800	312	348	-41.3	.2649+03	.3981+03	-52.0
37900	311	344	-41.5	.2638+03	.3967+03	-52.2

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/CM ³)	DEW POINT (DEG C)
035000	010	356	-41.8	226.03	.3954+03	-52.4
035100	011	356	-42.0	226.14+03	.3940+03	-52.6
035200	011	001	-42.2	226.02+03	.3926+03	-52.8
035300	008	355	-42.5	2591+03	.3912+03	-53.0
035400	009	012	-42.7	2579+03	.3898+03	-53.2
035500	010	022	-42.9	2566+03	.3884+03	-53.4
035600	008	005	-43.1	2556+03	.3871+03	-53.7
035700	011	016	-43.3	2545+03	.3857+03	-53.9
035800	011	005	-43.6	2533+03	.3843+03	-54.1
035900	011	010	-43.8	2522+03	.3830+03	-54.3
036000	013	013	-44.0	2510+03	.3816+03	-54.5
036100	011	000	-44.2	2499+03	.3803+03	-54.7
036200	014	357	-44.5	2488+03	.3790+03	-55.0
036300	014	350	-44.7	2476+03	.3776+03	-55.2
036400	015	355	-45.0	2465+03	.3763+03	-55.5
036500	016	350	-45.2	2454+03	.3750+03	-55.7
036600	015	352	-45.4	2443+03	.3737+03	-56.0
036700	015	347	-45.7	2432+03	.3724+03	-56.3
036800	015	354	-45.9	2421+03	.3711+03	-56.5
036900	016	348	-46.2	2410+03	.3698+03	-56.7
037000	015	343	-46.4	2399+03	.3685+03	-57.0
037100	016	344	-46.7	2388+03	.3674+03	-57.2
037200	017	348	-47.0	2377+03	.3662+03	-57.5
037300	017	338	-47.3	2366+03	.3650+03	-57.7
037400	018	340	-47.6	2355+03	.3638+03	-58.0
037500	016	337	-47.9	2344+03	.3626+03	-58.2
037600	017	348	-48.3	2333+03	.3615+03	-58.5
037700	019	337	-48.6	2323+03	.3603+03	-58.7
037800	020	336	-48.9	2312+03	.3592+03	-59.0
037900	021	344	-49.2	2302+03	.3580+03	-59.2
038000	021	339	-49.5	2291+03	.3569+03	-59.5
038100	021	343	-49.7	2280+03	.3555+03	-59.7
038200	021	334	-49.9	2270+03	.3542+03	-59.9
038300	020	343	-50.1	2259+03	.3529+03	-60.0
038400	019	340	-50.3	2249+03	.3516+03	-60.2
038500	020	346	-50.5	2236+03	.3503+03	-60.4
038600	019	345	-50.8	2228+03	.3490+03	-60.6
038700	019	347	-51.0	2218+03	.3477+03	-60.8
038800	016	346	-51.2	2207+03	.3464+03	-60.9
038900	017		-51.4	2197+03	.3451+03	-61.1
039000	017	34	-51.6	2187+03	.3439+03	-61.3
039100	015	342	-51.9	2177+03	.3427+03	-61.5
039200	016	347	-52.1	2166+03	.3414+03	-61.8
039300	014	41	-52.4	2156+03	.3402+03	-62.0
039400	012	332	-52.6	2146+03	.3391+03	-62.2
039500	012	331	-52.9	2136+03	.3379+03	-62.4
039600	010	337	-53.2	2126+03	.3367+03	-62.7
039700	011	320	-53.4	2116+03	.3355+03	-62.9
039800	010	323	-53.7	2106+03	.3343+03	-63.1
039900	011	323	-53.9	2096+03	.3331+03	-63.4

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TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG C)
34200	011	321	-54.2	.2086+03	.3220+03	-63.6
34100	011	328	-54.4	.2077+03	.3308+03	-63.8
34200	012	320	-54.7	.2067+03	.3296+03	-64.1
34300	012	348	-54.9	.2057+03	.3284+03	-64.3
34400	014	323	-55.2	.2047+03	.3272+03	-64.5
34500	015	344	-55.4	.2037+03	.3260+03	-64.7
34600	016	376	-55.7	.2028+03	.3249+03	-65.0
34700	016	355	-55.9	.2018+03	.3237+03	-65.2
34800	019	347	-56.2	.2009+03	.3225+03	-65.4
34900	019	351	-56.4	.1999+03	.3214+03	-65.7
34000	021	358	-56.7	.1989+03	.3202+03	-65.9
34100	020	353	-56.9	.1980+03	.3190+03	-9999.
34200	020	351	-57.2	.1970+03	.3178+03	-9999.
34300	020	353	-57.4	.1961+03	.3167+03	-9999.
34400	021	001	-57.7	.1952+03	.3155+03	-9999.
34500	020	351	-57.9	.1942+03	.3143+03	-9999.
34600	019	001	-58.1	.1933+03	.3132+03	-9999.
34700	019	003	-58.4	.1924+03	.3120+03	-9999.
34800	016	358	-58.6	.1914+03	.3109+03	-9999.
34900	020	005	-58.9	.1905+03	.3097+03	-9999.
34000	024	003	-59.1	.1896+03	.3086+03	-9999.
34100	024	003	-59.3	.1887+03	.3074+03	-9999.
34200	025	357	-59.6	.1876+03	.3063+03	-9999.
34300	026	354	-59.8	.1869+03	.3051+03	-9999.
34400	026	354	-60.1	.1860+03	.3040+03	-9999.
34500	026	356	-60.3	.1851+03	.3029+03	-9999.
34600	030	350	-60.5	.1842+03	.3017+03	-9999.
34700	030	356	-60.8	.1833+03	.3006+03	-9999.
34800	029	351	-61.0	.1824+03	.2995+03	-9999.
34900	030	354	-61.3	.1815+03	.2984+03	-9999.
34000	032	350	-61.5	.1806+03	.2973+03	-9999.
34100	031	357	-61.6	.1797+03	.2962+03	-9999.
34200	032	354	-62.0	.1788+03	.2951+03	-9999.
34300	034	357	-62.3	.1780+03	.2940+03	-9999.
34400	032	355	-62.5	.1771+03	.2929+03	-9999.
34500	033	356	-62.8	.1762+03	.2918+03	-9999.
34600	032	359	-63.1	.1754+03	.2908+03	-9999.
34700	032	357	-63.3	.1745+03	.2897+03	-9999.
34800	031	357	-63.6	.1736+03	.2886+03	-9999.
34900	026	002	-63.6	.1728+03	.2876+03	-9999.
34000	030	006	-64.1	.1719+03	.2865+03	-9999.
34100	031	356	-64.4	.1711+03	.2855+03	-9999.
34200	029	001	-64.6	.1702+03	.2844+03	-9999.
34300	029	001	-64.9	.1694+03	.2834+03	-9999.
34400	029	008	-65.2	.1686+03	.2823+03	-9999.
34500	026	003	-65.4	.1677+03	.2813+03	-9999.
34600	030	010	-65.7	.1669+03	.2803+03	-9999.
34700	029	003	-66.0	.1661+03	.2792+03	-9999.
34800	030	008	-66.3	.1652+03	.2782+03	-9999.
34900	029	007	-66.5	.1644+03	.2772+03	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
045200	030	002	-66.8	.1636+03	.2762+03	-9999.
045100	031	004	-67.0	.1628+03	.2750+03	-9999.
045200	031	006	-67.1	.1620+03	.2739+03	-9999.
045300	034	005	-67.3	.1611+03	.2727+03	-9999.
045400	033	003	-67.5	.1603+03	.2716+03	-9999.
045500	033	008	-67.6	.1595+03	.2704+03	-9999.
045600	033	015	-67.8	.1587+03	.2693+03	-9999.
045700	032	020	-68.0	.1579+03	.2682+03	-9999.
045800	032	015	-68.2	.1571+03	.2670+03	-9999.
045900	030	016	-68.3	.1563+03	.2659+03	-9999.
046000	020	023	-68.5	.1556+03	.2648+03	-9999.
046100	026	027	-68.7	.1548+03	.2637+03	-9999.
046200	025	030	-68.9	.1540+03	.2626+03	-9999.
046300	023	032	-69.1	.1532+03	.2615+03	-9999.
046400	022	031	-69.3	.1524+03	.2604+03	-9999.
046500	020	029	-69.4	.1517+03	.2594+03	-9999.
046600	019	026	-69.6	.1509+03	.2583+03	-9999.
046700	017	015	-69.8	.1501+03	.2572+03	-9999.
046800	017	019	-70.0	.1494+03	.2562+03	-9999.
046900	020	032	-70.2	.1486+03	.2551+03	-9999.
047000	018	004	-70.4	.1478+03	.2540+03	-9999.
047100	022	034	-70.4	.1471+03	.2527+03	-9999.
047200	021	039	-70.4	.1464+03	.2514+03	-9999.
047300	024	039	-70.3	.1456+03	.2501+03	-9999.
047400	025	036	-70.3	.1449+03	.2488+03	-9999.
047500	027	041	-70.3	.1441+03	.2475+03	-9999.
047600	031	033	-70.3	.1434+03	.2462+03	-9999.
047700	033	035	-70.3	.1427+03	.2450+03	-9999.
047800	034	036	-70.2	.1419+03	.2437+03	-9999.
047900	037	029	-70.2	.1412+03	.2424+03	-9999.
048000	035	034	-70.2	.1405+03	.2412+03	-9999.
048100	030	037	-70.1	.1398+03	.2398+03	-9999.
048200	026	045	-70.0	.1391+03	.2385+03	-9999.
048300	024	043	-69.8	.1384+03	.2371+03	-9999.
048400	020	045	-69.7	.1377+03	.2358+03	-9999.
048500	016	023	-69.6	.1370+03	.2344+03	-9999.
048600	013	031	-69.5	.1363+03	.2331+03	-9999.
048700	013	012	-69.4	.1356+03	.2318+03	-9999.
048800	010	007	-69.2	.1349+03	.2305+03	-9999.
048900	011	004	-69.1	.1342+03	.2292+03	-9999.
049000	014	005	-69.0	.1335+03	.2279+03	-9999.
049100	011	005	-68.9	.1329+03	.2266+03	-9999.
049200	015	020	-68.8	.1322+03	.2254+03	-9999.
049300	013	022	-68.7	.1315+03	.2241+03	-9999.
049400	017	029	-68.6	.1309+03	.2229+03	-9999.
049500	019	026	-68.4	.1302+03	.2216+03	-9999.
049600	020	020	-68.3	.1296+03	.2204+03	-9999.
049700	022	024	-68.2	.1289+03	.2191+03	-9999.
049800	026	027	-68.1	.1283+03	.2179+03	-9999.
049900	027	024	-68.0	.1276+03	.2167+03	-9999.

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TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG C)
05000	027	269	-67.9	.1270+03	.2155+03	-9999.
05010	027	269	-67.9	.1263+03	.2144+03	-9999.
05020	029	294	-67.8	.1257+03	.2132+03	-9999.
05030	026	302	-67.7	.1251+03	.2121+03	-9999.
05040	028	304	-67.7	.1244+03	.2110+03	-9999.
05050	024	304	-67.6	.1238+03	.2099+03	-9999.
05060	021	314	-67.6	.1232+03	.2088+03	-9999.
05070	021	323	-67.6	.1226+03	.2077+03	-9999.
05080	022	306	-67.5	.1220+03	.2066+03	-9999.
05090	017	320	-67.4	.1213+03	.2055+03	-9999.
05100	016	278	-67.4	.1207+03	.2044+03	-9999.
05110	012	263	-67.4	.1201+03	.2034+03	-9999.
05120	010	247	-67.4	.1195+03	.2024+03	-9999.
05130	015	236	-67.4	.1189+03	.2013+03	-9999.
05140	017	245	-67.4	.1183+03	.2003+03	-9999.
05150	022	250	-67.3	.1177+03	.1993+03	-9999.
05160	019	247	-67.3	.1171+03	.1983+03	-9999.
05170	022	260	-67.3	.1166+03	.1973+03	-9999.
05180	024	252	-67.3	.1160+03	.1963+03	-9999.
05190	026	248	-67.3	.1154+03	.1953+03	-9999.
05200	022	244	-67.3	.1148+03	.1943+03	-9999.
05210	020	249	-67.3	.1142+03	.1934+03	-9999.
05220	019	253	-67.4	.1137+03	.1925+03	-9999.
05230	016	246	-67.4	.1131+03	.1915+03	-9999.
05240	013	229	-67.5	.1125+03	.1906+03	-9999.
05250	019	228	-67.5	.1120+03	.1897+03	-9999.
05260	019	229	-67.6	.1114+03	.1888+03	-9999.
05270	019	229	-67.6	.1108+03	.1879+03	-9999.
05280	019	236	-67.7	.1103+03	.1870+03	-9999.
05290	019	236	-67.7	.1097+03	.1861+03	-9999.
05300	017	234	-67.8	.1092+03	.1852+03	-9999.
05310	018	243	-67.8	.1086+03	.1843+03	-9999.
05320	018	246	-67.8	.1081+03	.1833+03	-9999.
05330	016	257	-67.6	.1075+03	.1824+03	-9999.
05340	015	262	-67.8	.1070+03	.1815+03	-9999.
05350	013	260	-67.7	.1065+03	.1806+03	-9999.
05360	012	275	-67.7	.1059+03	.1797+03	-9999.
05370	012	277	-67.7	.1054+03	.1787+03	-9999.
05380	007	268	-67.7	.1049+03	.1778+03	-9999.
05390	007	268	-67.7	.1043+03	.1769+03	-9999.
05400	004	304	-67.7	.1038+03	.1760+03	-9999.
05410	004	311	-67.7	.1033+03	.1752+03	-9999.
05420	004	013	-67.8	.1028+03	.1744+03	-9999.
05430	004	028	-67.8	.1023+03	.1735+03	-9999.
05440	004	053	-67.9	.1017+03	.1727+03	-9999.
05450	005	076	-67.9	.1012+03	.1719+03	-9999.
05460	004	090	-68.0	.1007+03	.1710+03	-9999.
05470	004	061	-68.0	.1002+03	.1702+03	-9999.
05480	002	119	-68.1	.9972+02	.1694+03	-9999.
05490	005	005	-68.1	.9922+02	.1686+03	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG C)
055000	006	006	-66.2	.9872+02	.1678+03	-9999.
056000	006	057	-68.2	.9387+02	.1596+03	-9999.
057000	006	085	-67.7	.8926+02	.1514+03	-9999.
058000	005	104	-66.0	.8489+02	.1428+03	-9999.
059000	007	126	-63.9	.8079+02	.1345+03	-9999.
060000	009	131	-63.2	.7690+02	.1276+03	-9999.
061000	011	123	-63.2	.7321+02	.1215+03	-9999.
062000	013	107	-62.9	.6969+02	.1155+03	-9999.
063000	017	107	-62.2	.6636+02	.1096+03	-9999.
064000	016	110	-62.0	.6319+02	.1043+03	-9999.
065000	014	107	-59.7	.6019+02	.9823+02	-9999.
066000	012	102	-58.9	.5735+02	.9325+02	-9999.
067000	012	098	-58.9	.5465+02	.8886+02	-9999.
068000	012	097	-57.8	.5209+02	.8427+02	-9999.
069000	014	098	-56.5	.4966+02	.7985+02	-9999.
070000	017	090	-56.6	.4734+02	.7623+02	-9999.
071000	020	083	-56.6	.4514+02	.7262+02	-9999.
072000	024	081	-55.9	.4304+02	.6902+02	-9999.
073000	028	025	-55.0	.4105+02	.6555+02	-9999.
074000	029	090	-54.4	.3916+02	.6236+02	-9999.
075000	031	094	-53.0	.3736+02	.5912+02	-9999.
076000	033	098	-51.2	.3565+02	.5596+02	-9999.
077000	036	102	-50.5	.3404+02	.5326+02	-9999.
078000	041	108	-50.8	.3249+02	.5090+02	-9999.
079000	043	112	-50.6	.3102+02	.4856+02	-9999.
080000	043	116	-49.6	.2962+02	.4620+02	-9999.
081000	040	113	-47.7	.2829+02	.4371+02	-9999.
082000	036	110	-47.0	.2703+02	.4164+02	-9999.
083000	039	106	-47.0	.2582+02	.3977+02	-9999.
084000	042	106	-46.2	.2467+02	.3787+02	-9999.
085000	045	103	-45.1	.2358+02	.3602+02	-9999.
086000	047	100	-44.3	.2254+02	.3431+02	-9999.
087000	049	095	-44.1	.2155+02	.3278+02	-9999.
088000	049	090	-43.8	.2060+02	.3129+02	-9999.
089000	046	087	-43.2	.1970+02	.2984+02	-9999.
090000	045	086	-42.1	.1884+02	.2841+02	-9999.
091000	043	085	-41.3	.1802+02	.2708+02	-9999.
092000	042	083	-40.9	.1723+02	.2584+02	-9999.
093000	043	081	-40.7	.1649+02	.2471+02	-9999.
094000	045	081	-39.9	.1577+02	.2355+02	-9999.
095000	047	081	-38.7	.1505+02	.2236+02	-9999.
096000	050	089	-40.0	.1438+02	.2149+02	-9999.
097000	052	100	-39.3	.1372+02	.2043+02	-9999.
098000	050	103	-38.6	.1313+02	.1950+02	-9999.
099000	050	099	-38.0	.1256+02	.1811+02	-9999.
100000	052	094	-37.3	.1203+02	.1776+02	-9999.
101000	052	092	-37.0	.1151+02	.1698+02	-9999.
102000	054	093	-37.4	.1102+02	.1629+02	-9999.
103000	055	098	-38.0	.1055+02	.1563+02	-9999.
104000	057	108	-38.1	.1010+02	.1497+02	-9999.

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TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/CM ³)	DEW POINT (DEG C)
105000	055	117	-38.0	.9667+01	.1432+02	-9999.
106000	054	123	-37.8	.9253+01	.1370+02	-9999.
107000	052	124	-37.6	.8857+01	.1310+02	-9999.
108000	052	120	-37.4	.8479+01	.1253+02	-9999.
109000	052	117	-37.2	.8117+01	.1198+02	-9999.
110000	054	114	-37.0	.7771+01	.1146+02	-9999.
111000	055	108	-36.0	.7441+01	.1093+02	-9999.
112000	057	103	-34.2	.7127+01	.1039+02	-9999.
113000	059	100	-32.6	.6828+01	.9887+01	-9999.
114000	057	097	-31.5	.6543+01	.9431+01	-9999.
115000	055	092	-30.8	.6271+01	.9014+01	-9999.
116000	057	084	-30.5	.6010+01	.8630+01	-9999.
117000	062	078	-30.4	.5761+01	.8268+01	-9999.
118000	069	073	-30.1	.5522+01	.7917+01	-9999.
119000	077	072	-29.4	.5294+01	.7566+01	-9999.
120000	086	073	-28.3	.5076+01	.7221+01	-9999.
121000	089	074	-27.1	.4868+01	.6893+01	-9999.
122000	087	061	-26.1	.4669+01	.6563+01	-9999.
123000	067	077	-25.1	.4480+01	.6290+01	-9999.
124000	091	074	-24.8	.4296+01	.6028+01	-9999.
125000	094	073	-24.1	.4124+01	.5769+01	-9999.
126000	099	076	-22.6	.3958+01	.5504+01	-9999.
127000	101	084	-21.2	.3800+01	.5254+01	-9999.
128000	097	094	-18.7	.3649+01	.4995+01	-9999.
129000	094	102	-15.0	.3505+01	.4731+01	-9999.
130000	089	112	-13.7	.3369+01	.4525+01	-9999.
131000	086	118	-14.2	.3238+01	.4357+01	-9999.
132000	084	118	-14.6	.3112+01	.4197+01	-9999.
133000	084	113	-15.2	.2991+01	.4039+01	-9999.
134000	087	106	-15.2	.2874+01	.3881+01	-9999.
135000	096	101	-14.8	.2762+01	.3725+01	-9999.
136000	104	097	-14.5	.2655+01	.3575+01	-9999.
137000	113	094	-14.1	.2552+01	.3432+01	-9999.
138000	116	093	-13.8	.2453+01	.3295+01	-9999.
139000	116	094	-13.5	.2358+01	.3163+01	-9999.
140000	116	094	-13.2	.2267+01	.3037+01	-9999.
141000	113	094	-12.9	.2179+01	.2916+01	-9999.
142000	106	095	-12.6	.2095+01	.2801+01	-9999.
143000	103	096	-12.3	.2014+01	.2690+01	-9999.
144000	101	097	-12.0	.1936+01	.2583+01	-9999.
145000	103	097	-11.7	.1862+01	.2461+01	-9999.
146000	104	096	-11.5	.1791+01	.2384+01	-9999.
147000	113	095	-11.2	.1722+01	.2290+01	-9999.
148000	121	094	-11.0	.1656+01	.2200+01	-9999.
149000	126	093	-10.3	.1592+01	.2111+01	-9999.
150000	131	093	-9.3	.1532+01	.2022+01	-9999.
151000	135	092	-7.7	.1473+01	.1934+01	-9999.
152000	133	091	-6.5	.1416+01	.1852+01	-9999.
153000	131	090	-5.6	.1365+01	.1777+01	-9999.
154000	126	089	-5.1	.1313+01	.1707+01	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
15200	124	088	-4.7	.1264+01	.1680+01	-9999.
15200	123	086	-4.3	.1217+01	.1577+01	-9999.
15700	124	066	-4.1	.1171+01	.1517+01	-9999.
15800	126	085	-4.1	.1128+01	.1460+01	-9999.
15900	126	084	-4.2	.1086+01	.1406+01	-9999.
16000	135	085	-4.4	.1045+01	.1355+01	-9999.
16100	141	085	-4.7	.1006+01	.1305+01	-9999.
16200	146	085	-4.9	.9683+00	.1257+01	-9999.
16300	157	085	-5.1	.9320+00	.1211+01	-9999.
16400	170	085	-5.3	.8971+00	.1167+01	-9999.
16500	175	086	-5.6	.8635+00	.1124+01	-9999.
16600	163	087	-5.8	.8311+00	.1083+01	-9999.
16700	167	090	-6.1	.7999+00	.1043+01	-9999.
16800	177	091	-6.3	.7698+00	.1005+01	-9999.
16900	185	094	-6.5	.7408+00	.9679+00	-9999.
17000	189	096	-6.7	.7130+00	.9324+00	-9999.
17100	182	097	-7.0	.6861+00	.8980+00	-9999.
17200	172	095	-7.3	.6602+00	.8653+00	-9999.
17300	175	095	-8.1	.6353+00	.8351+00	-9999.
17400	190	097	-9.2	.6112+00	.8066+00	-9999.
17500	202	096	-9.9	.5880+00	.7780+00	-9999.
17600	200	096	-9.3	.5656+00	.7467+00	-9999.
17700	187	093	-9.1	.5441+00	.7179+00	-9999.
17800	173	093	-10.1	.5235+00	.6932+00	-9999.
17900	177	094	-10.9	.5035+00	.6689+00	-9999.
18000	182	096	-11.8	.4842+00	.6455+00	-9999.
18100	184	097	-13.0	.4656+00	.6235+00	-9999.
18200	180	097	-13.6	.4477+00	.6009+00	-9999.
18300	172	096	-14.7	.4303+00	.5801+00	-9999.
18400	179	095	-15.7	.4137+00	.5597+00	-9999.
18500	167	094	-16.4	.3975+00	.5393+00	-9999.
18600	165	093	-17.4	.3820+00	.5203+00	-9999.
18700	160	090	-18.1	.3671+00	.5014+00	-9999.
18800	165	090	-19.2	.3526+00	.4836+00	-9999.
18900	175	092	-19.9	.3387+00	.4658+00	-9999.
19000	184	093	-20.8	.3253+00	.4490+00	-9999.
19100	179	093	-21.7	.3124+00	.4328+00	-9999.
19200	172	092	-22.5	.3000+00	.4170+00	-9999.
19300	170	092	-23.2	.2880+00	.4014+00	-9999.
19400	172	094	-24.3	.2764+00	.3870+00	-9999.
19500	166	095	-25.6	.2653+00	.3733+00	-9999.
19600	172	100	-26.9	.2546+00	.3601+00	-9999.
19700	166	104	-28.2	.2442+00	.3474+00	-9999.
19800	162	108	-29.6	.2342+00	.3350+00	-9999.
19900	165	111	-30.9	.2246+00	.3230+00	-9999.
20000	177	111	-32.3	.2153+00	.3114+00	-9999.
20100	175	110	-33.6	.2064+00	.3002+00	-9999.
20200	175	107	-34.7	.1977+00	.2889+00	-9999.
20300	175	104	-36.3	.1894+00	.2786+00	-9999.
20400	168	101	-37.7	.1814+00	.2684+00	-9999.

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TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
20500	167	099	-38.8	.1737+00	.2563+00	-9999.
20600	160	097	-39.8	.1663+00	.2483+00	-9999.
20700	163	095	-40.8	.1592+00	.2387+00	-9999.
20800	172	093	-41.6	.1524+00	.2294+00	-9999.
20900	185	092	-42.6	.1458+00	.2203+00	-9999.
21000	206	092	-43.4	.1395+00	.2115+00	-9999.
21100	222	091	-44.3	.1334+00	.2031+00	-9999.
21200	219	089	-45.0	.1276+00	.1949+00	-9999.
21300	216	087	-45.5	.1220+00	.1870+00	-9999.
21400	221	087	-47.5	.1166+00	.1800+00	-9999.
21500	229	087	-48.7	.1115+00	.1733+00	-9999.
21600	241	086	-49.3	.1065+00	.1658+00	-9999.
21700	233	084	-50.3	.1018+00	.1581+00	-9999.
21800	222	082	-51.5	.9720-01	.1528+00	-9999.
21900	214	081	-53.0	.9290-01	.1470+00	-9999.
22000	221	083	-54.9	.8860-01	.1414+00	-9999.
22100	231	088	-56.1	.8460-01	.1358+00	-9999.
22200	231	091	-58.2	.8070-01	.1306+00	-9999.
22300	211	093	-62.5	.7690-01	.1272+00	-9999.
22400	187	095	-66.0	.7330-01	.1232+00	-9999.
22500	168	096	-69.0	.7060-01	.1205+00	-9999.
22600	113	118	-71.2	.6720-01	.1159+00	-9999.
22700	099	119	-69.3	.6450-01	.1102+00	-9999.
22800	089	119	-69.2	.6140-01	.1049+00	-9999.
22900	081	116	-67.2	.5840-01	.9877-01	-9999.
23000	070	112	-69.9	.5560-01	.9531-01	-9999.
23100	062	106	-71.2	.5300-01	.9140-01	-9999.
23200	055	097	-73.3	.5050-01	.8802-01	-9999.
23300	052	087	-76.3	.4790-01	.8477-01	-9999.
23400	050	076	-78.2	.4550-01	.8129-01	-9999.
23500	052	067	-80.4	.4310-01	.7791-01	-9999.
23600	055	059	-81.5	.4090-01	.7434-01	-9999.
23700	060	053	-80.8	.3840-01	.7026-01	-9999.
23800	067	049	-78.2	.3680-01	.6574-01	-9999.
23900	070	046	-78.6	.3500-01	.6266-01	-9999.
24000	074	043	-77.4	.3320-01	.5908-01	-9999.
24100	079	040	-75.9	.3160-01	.5580-01	-9999.
24200	082	038	-75.2	.3000-01	.5278-01	-9999.
24300	086	037	-74.2	.2850-01	.4969-01	-9999.
24400	069	035	-74.2	.2710-01	.4744-01	-9999.
24500	092	033	-74.4	.2570-01	.4513-01	-9999.
24600	096	031	-73.3	.2450-01	.4270-01	-9999.
24700	097	029	-72.2	.2330-01	.4038-01	-9999.
24800	099	028	-71.2	.2210-01	.3812-01	-9999.
24900	101	026	-69.7	.2100-01	.3595-01	-9999.
25000	104	024	-68.2	.2000-01	.3399-01	-9999.
25100	106	022	-68.2	.1910-01	.3246-01	-9999.
25200	109	021	-68.2	.1820-01	.3093-01	-9999.
25300	111	019	-68.2	.1730-01	.2940-01	-9999.
25400	113	018	-68.2	.1640-01	.2787-01	-9999.

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TABLE 4. (Concluded)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/CM ³)	DEW POINT (DEG C)
24000	169	267	-53.6	.1370-03	.2340-03	-9999.
24000	130	267	-48.6	.1370-03	.2030-03	-9999.
24000	131	267	-42.1	.1370-03	.1750-03	-9999.
24000	128	265	-35.6	.1070-03	.1490-03	-9999.
25000	120	264	-29.1	.9460-04	.1280-03	-9999.
25000	120	261	-22.6	.8350-04	.1090-03	-9999.
26100	114	262	-16.6	.7370-04	.9370-04	-9999.
26200	106	263	-6.2	.6680-04	.8160-04	-9999.
26700	106	257	3.5	.6050-04	.7110-04	-9999.
27000	104	253	13.2	.5570-04	.6190-04	-9999.
27000	101	247	23.0	.4940-04	.5390-04	-9999.
27000	107	239	32.7	.4450-04	.4690-04	-9999.
27000	104	238	41.1	.4050-04	.4110-04	-9999.
27000	102	245	54.2	.3720-04	.3630-04	-9999.
28000	102	241	65.7	.3420-04	.3220-04	-9999.
28000	102	238	77.4	.3160-04	.2660-04	-9999.
29000	102	234	89.4	.2920-04	.2560-04	-9999.
29000	102	230	101.6	.2710-04	.2290-04	-9999.
29000	103	226	116.1	.2520-04	.2050-04	-9999.
30000	104	222	126.6	.2350-04	.1850-04	-9999.

TABLE 5. STS-4 FINAL SRB DESCENT METEOROLOGICAL DATA TAPE

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
00000	001	210	10.1	1018.0	1.1860	22.4
00100	011	322	24.4	.9857+03	.1142+04	22.1
00200	011	315	22.0	.9520+03	.1113+04	20.5
00300	009	314	20.6	.9193+03	.1082+04	16.2
00400	011	323	18.4	.8875+03	.1053+04	14.1
00500	014	315	16.2	.8565+03	.1023+04	15.1
00600	013	307	15.5	.8245+03	.9920+03	9.7
00700	015	302	14.2	.7974+03	.9623+03	6.1
00800	020	291	12.5	.7691+03	.9372+03	5.8
00900	025	290	10.6	.7417+03	.9072+03	2.4
01000	027	293	8.8	.7150+03	.8808+03	-2.8
01100	026	288	7.5	.6892+03	.8533+03	-4.0
01200	027	287	5.9	.6642+03	.8270+03	-4.1
01300	034	294	3.8	.6399+03	.8028+03	-4.5
01400	036	294	1.4	.6163+03	.7797+03	-3.5
01500	035	293	-1.3	.5938+03	.7587+03	-7.0
01600	036	296	-3.3	.5712+03	.7356+03	-7.5
01700	039	294	-5.2	.5496+03	.7129+03	-8.6
01800	036	291	-5.9	.5287+03	.6914+03	-22.1
01900	036	290	-7.4	.5085+03	.6680+03	-20.4
02000	036	288	-8.6	.4890+03	.6433+03	-18.3
02100	033	288	-10.4	.4702+03	.6226+03	-16.9
02200	032	287	-12.4	.4520+03	.6032+03	-18.4
02300	031	287	-14.5	.4343+03	.5844+03	-22.0
02400	029	290	-16.2	.4172+03	.5652+03	-25.4
02500	027	290	-18.0	.4006+03	.5467+03	-30.1
02600	026	281	-20.3	.3846+03	.5287+03	-30.0
02700	025	277	-23.4	.3691+03	.5145+03	-27.4
02800	023	278	-25.3	.3540+03	.4973+03	-29.0
02900	019	275	-28.4	.3394+03	.4829+03	-32.5
03000	015	282	-29.7	.3253+03	.4686+03	-36.2
03100	016	310	-31.4	.3117+03	.4542+03	-41.8
03200	017	327	-33.9	.2986+03	.4347+03	-45.5
03300	014	336	-36.1	.2859+03	.4201+03	-47.6
03400	014	345	-36.7	.2736+03	.4065+03	-49.5
03500	015	352	-40.9	.2617+03	.3926+03	-51.1
03600	016	354	-44.4	.2502+03	.3810+03	-53.7
03700	015	355	-46.9	.2391+03	.3681+03	-56.1
03800	011	357	-48.9	.2283+03	.3547+03	-58.4
03900	009	004	-50.9	.2180+03	.3417+03	-60.4
04000	010	004	-53.3	.2080+03	.3296+03	-62.5
04100	011	003	-56.0	.1984+03	.3183+03	-65.0
04200	013	004	-58.9	.1891+03	.3075+03	-67.3
04300	020	002	-61.8	.1801+03	.2969+03	-69.9
04400	023	002	-63.8	.1715+03	.2858+03	-72.9
04500	025	359	-65.8	.1632+03	.2742+03	-75.9
04600	027	353	-68.1	.1552+03	.2637+03	-78.9
04700	026	347	-68.8	.1475+03	.2515+03	-81.9
04800	026	339	-68.5	.1401+03	.2388+03	-84.9
04900	021	335	-65.9	.1334+03	.2242+03	-87.9

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
350000	019	330	-65.9	-1269+03	-2133+03	-9999.
351000	024	330	-65.7	-1207+03	-2027+03	-9999.
352000	025	331	-65.5	-1149+03	-1921+03	-9999.
353000	020	328	-66.1	-1093+03	-1839+03	-9999.
354000	014	321	-67.6	-1039+03	-1762+03	-9999.
355000	006	303	-68.1	-9883+02	-1679+03	-9999.
356000	007	291	-69.8	-9306+02	-1610+03	-9999.
357000	006	310	-67.9	-8932+02	-1516+03	-9999.
358000	004	328	-66.1	-8485+02	-1429+03	-9999.
359000	006	346	-65.1	-8083+02	-1353+03	-9999.
360000	005	011	-63.8	-7693+02	-1280+03	-9999.
361000	005	046	-63.2	-7323+02	-1215+03	-9999.
362000	007	084	-63.0	-6971+02	-1156+03	-9999.
363000	011	095	-62.6	-6637+02	-1098+03	-9999.
364000	013	092	-62.2	-6320+02	-1048+03	-9999.
365000	015	092	-61.5	-6018+02	-9905+02	-9999.
366000	019	105	-59.6	-5733+02	-9352+02	-9999.
367000	022	109	-58.5	-5463+02	-8866+02	-9999.
368000	022	105	-58.0	-5207+02	-8411+02	-9999.
369000	022	097	-57.3	-4963+02	-8010+02	-9999.
370000	025	095	-55.9	-4732+02	-7588+02	-9999.
371000	027	099	-54.1	-4514+02	-7179+02	-9999.
372000	028	100	-53.2	-4306+02	-6820+02	-9999.
373000	019	061	-52.0	-4109+02	-6473+02	-9999.
374000	015	070	-51.6	-3922+02	-6167+02	-9999.
375000	028	102	-50.6	-3744+02	-5851+02	-9999.
376000	039	107	-50.5	-3575+02	-5578+02	-9999.
377000	041	103	-50.4	-3413+02	-5378+02	-9999.
378000	037	093	-50.3	-3258+02	-5091+02	-9999.
379000	035	085	-50.2	-3111+02	-4861+02	-9999.
380000	034	084	-49.9	-2970+02	-4635+02	-9999.
381000	036	067	-49.1	-2837+02	-4411+02	-9999.
382000	036	091	-48.0	-2709+02	-4192+02	-9999.
383000	040	095	-46.9	-2588+02	-3985+02	-9999.
384000	043	096	-46.8	-2473+02	-3806+02	-9999.
385000	045	095	-46.8	-2363+02	-3637+02	-9999.
386000	045	094	-46.5	-2256+02	-3471+02	-9999.
387000	045	093	-46.2	-2157+02	-3311+02	-9999.
388000	049	089	-45.7	-2062+02	-3158+02	-9999.
389000	044	086	-45.2	-1971+02	-3012+02	-9999.
390000	045	085	-44.7	-1884+02	-2873+02	-9999.
391000	040	084	-44.4	-1801+02	-2743+02	-9999.
392000	046	082	-43.5	-1722+02	-2612+02	-9999.
393000	046	060	-41.8	-1646+02	-2479+02	-9999.
394000	045	079	-41.3	-1566+02	-2354+02	-9999.
395000	046	082	-40.7	-1496+02	-2245+02	-9999.
396000	050	089	-40.0	-1438+02	-2149+02	-9999.
397000	052	100	-39.3	-1372+02	-2043+02	-9999.
398000	050	103	-38.6	-1313+02	-1950+02	-9999.
399000	050	099	-38.0	-1256+02	-1861+02	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
10000	052	092	-37.0	.1151+02	.1776+02	-9999.
10000	052	092	-37.0	.1151+02	.1776+02	-9999.
10200	054	093	-37.4	.1102+02	.1628+02	-9999.
10300	055	098	-38.0	.1055+02	.1563+02	-9999.
10400	057	108	-38.4	.1010+02	.1492+02	-9999.
10500	055	117	-38.0	.9667+01	.1432+02	-9999.
10600	054	123	-37.8	.9253+01	.1370+02	-9999.
10700	052	124	-37.6	.8857+01	.1310+02	-9999.
10800	052	120	-37.4	.8479+01	.1253+02	-9999.
10900	052	117	-37.2	.8117+01	.1198+02	-9999.
11000	054	114	-37.0	.7771+01	.1146+02	-9999.
11100	055	108	-36.0	.7441+01	.1093+02	-9999.
11200	057	103	-34.2	.7127+01	.1033+02	-9999.
11300	059	100	-32.6	.6828+01	.9887+01	-9999.
11400	057	097	-31.5	.6543+01	.9431+01	-9999.
11500	055	092	-30.6	.6271+01	.9014+01	-9999.
11600	057	084	-30.5	.6010+01	.8630+01	-9999.
11700	062	078	-30.4	.5761+01	.8268+01	-9999.
11800	069	073	-30.1	.5522+01	.7917+01	-9999.
11900	077	072	-29.4	.5294+01	.7566+01	-9999.
12000	086	073	-28.3	.5076+01	.7227+01	-9999.
12100	089	078	-27.1	.4868+01	.6897+01	-9999.
12200	087	081	-26.1	.4669+01	.6583+01	-9999.
12300	087	077	-25.1	.4480+01	.6290+01	-9999.
12400	091	074	-24.8	.4298+01	.6028+01	-9999.
12500	094	073	-24.1	.4124+01	.5769+01	-9999.
12600	099	076	-22.6	.3958+01	.5504+01	-9999.
12700	101	084	-21.2	.3800+01	.5254+01	-9999.
12800	097	084	-18.7	.3649+01	.4995+01	-9999.
12900	094	102	-15.0	.3505+01	.4731+01	-9999.
13000	089	112	-13.7	.3369+01	.4525+01	-9999.
13100	086	118	-14.2	.3238+01	.4357+01	-9999.
13200	084	118	-14.8	.3112+01	.4197+01	-9999.
13300	084	113	-15.2	.2991+01	.4039+01	-9999.
13400	087	106	-15.2	.2874+01	.3881+01	-9999.
13500	096	101	-14.6	.2762+01	.3725+01	-9999.
13600	104	097	-14.5	.2655+01	.3575+01	-9999.
13700	113	094	-14.1	.2552+01	.3432+01	-9999.
13800	116	093	-13.8	.2453+01	.3295+01	-9999.
13900	116	094	-13.5	.2358+01	.3163+01	-9999.
14000	114	094	-13.2	.2267+01	.3037+01	-9999.
14100	113	094	-12.9	.2179+01	.2916+01	-9999.
14200	108	095	-12.6	.2095+01	.2801+01	-9999.
14300	103	096	-12.3	.2014+01	.2690+01	-9999.
14400	101	097	-12.0	.1936+01	.2583+01	-9999.
14500	103	097	-11.7	.1862+01	.2481+01	-9999.
14600	106	094	-11.5	.1791+01	.2384+01	-9999.
14700	113	095	-11.2	.1722+01	.2290+01	-9999.
14800	121	094	-11.0	.1656+01	.2200+01	-9999.
14900	128	093	-10.3	.1592+01	.2111+01	-9999.

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TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
15000	131	093	-9.3	.1532+01	.2022+01	-9999.
15100	135	092	-7.7	.1473+01	.1934+01	-9999.
15200	133	091	-6.5	.1418+01	.1852+01	-9999.
15300	131	090	-5.6	.1365+01	.1777+01	-9999.
15400	128	089	-5.1	.1313+01	.1703+01	-9999.
15500	124	088	-4.7	.1264+01	.1640+01	-9999.
15600	123	086	-4.3	.1212+01	.1577+01	-9999.
15700	124	086	-4.1	.1171+01	.1517+01	-9999.
15800	126	085	-4.1	.1128+01	.1460+01	-9999.
15900	126	084	-4.2	.1086+01	.1406+01	-9999.
16000	135	085	-4.4	.1045+01	.1355+01	-9999.
16100	141	085	-4.7	.1006+01	.1305+01	-9999.
16200	148	085	-4.9	.9683+00	.1257+01	-9999.
16300	157	085	-5.1	.9320+00	.1211+01	-9999.
16400	176	085	-5.3	.8971+00	.1167+01	-9999.
16500	175	086	-5.6	.8635+00	.1124+01	-9999.
16600	163	087	-5.6	.8311+00	.1083+01	-9999.
16700	167	090	-6.1	.7999+00	.1043+01	-9999.
16800	177	091	-6.3	.7698+00	.1005+01	-9999.
16900	185	094	-6.5	.7408+00	.9679+00	-9999.
17000	189	096	-6.7	.7130+00	.9324+00	-9999.
17100	180	097	-7.0	.6861+00	.8980+00	-9999.
17200	172	095	-7.3	.6602+00	.8653+00	-9999.
17300	175	095	-8.1	.6353+00	.8351+00	-9999.
17400	190	097	-9.2	.6112+00	.8066+00	-9999.
17500	202	098	-9.9	.5880+00	.7780+00	-9999.
17600	200	096	-5.3	.5656+00	.7467+00	-9999.
17700	187	093	-9.1	.5441+00	.7179+00	-9999.
17800	173	093	-10.1	.5235+00	.6932+00	-9999.
17900	177	094	-10.9	.5035+00	.6689+00	-9999.
18000	182	096	-11.8	.4842+00	.6455+00	-9999.
18100	184	097	-13.0	.4656+00	.6235+00	-9999.
18200	180	097	-13.6	.4477+00	.6009+00	-9999.
18300	172	096	-14.7	.4303+00	.5801+00	-9999.
18400	179	095	-15.7	.4137+00	.5597+00	-9999.
18500	167	094	-16.4	.3975+00	.5393+00	-9999.
18600	165	093	-17.4	.3820+00	.5203+00	-9999.
18700	160	090	-18.1	.3671+00	.5014+00	-9999.
18800	165	090	-19.2	.3526+00	.4836+00	-9999.
18900	175	092	-19.9	.3387+00	.4658+00	-9999.
19000	184	093	-20.8	.3253+00	.4490+00	-9999.
19100	179	093	-21.7	.3124+00	.4328+00	-9999.
19200	172	092	-22.5	.3000+00	.4170+00	-9999.
19300	170	092	-23.2	.2880+00	.4014+00	-9999.
19400	172	094	-24.3	.2764+00	.3870+00	-9999.
19500	166	095	-25.6	.2653+00	.3733+00	-9999.
19600	172	100	-26.9	.2556+00	.3601+00	-9999.
19700	161	104	-28.2	.2442+00	.3474+00	-9999.
19800	162	108	-29.6	.2342+00	.3350+00	-9999.
19900	165	111	-30.9	.2246+00	.3230+00	-9999.

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TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M ³)	DEW POINT (DEG C)
20200	177	111	-32.3	2153+00	3114+00	-9999.
20100	175	110	-33.6	2064+00	3002+00	-9999.
20200	175	127	-34.7	1977+00	2889+00	-9999.
20300	175	104	-36.3	1894+00	2786+00	-9999.
20400	164	101	-37.7	1814+00	2684+00	-9999.
20500	167	099	-38.8	1737+00	2583+00	-9999.
20600	160	097	-39.8	1663+00	2483+00	-9999.
20700	163	095	-40.8	1592+00	2387+00	-9999.
20800	172	093	-41.8	1524+00	2294+00	-9999.
20900	185	092	-42.6	1458+00	2203+00	-9999.
21000	206	092	-43.4	1395+00	2115+00	-9999.
21100	222	091	-44.3	1334+00	2031+00	-9999.
21200	219	089	-45.0	1276+00	1949+00	-9999.
21300	216	087	-45.9	1220+00	1870+00	-9999.
21400	221	087	-47.5	1166+00	1800+00	-9999.
21500	229	087	-48.7	1115+00	1731+00	-9999.
21600	241	084	-50.3	1065+00	1658+00	-9999.
21700	233	084	-51.5	1018+00	1591+00	-9999.
21800	222	082	-53.0	9720+01	1528+00	-9999.
21900	214	081	-54.9	9290+01	1470+00	-9999.
22000	221	083	-56.1	8860+01	1414+00	-9999.
22100	231	088	-58.2	8460+01	1358+00	-9999.
22200	231	091	-62.5	8070+01	1308+00	-9999.
22300	211	093	-66.0	7690+01	1272+00	-9999.
22400	187	095	-69.0	7330+01	1232+00	-9999.
22500	168	098	-71.2	7060+01	1205+00	-9999.
22600	113	118	-71.2	6720+01	1159+00	-9999.
22700	096	119	-69.3	6450+01	1102+00	-9999.
22800	089	119	-67.2	6140+01	1049+00	-9999.
22900	081	116	-67.2	5840+01	9877+01	-9999.
23000	070	112	-69.9	5560+01	9531+01	-9999.
23100	062	106	-71.2	5300+01	9140+01	-9999.
23200	055	097	-73.3	5050+01	8802+01	-9999.
23300	052	087	-76.3	4790+01	8477+01	-9999.
23400	050	076	-78.2	4550+01	8129+01	-9999.
23500	052	067	-80.4	4310+01	7791+01	-9999.
23600	055	052	-81.5	4090+01	7434+01	-9999.
23700	060	053	-80.8	3880+01	7026+01	-9999.
23800	067	049	-78.2	3680+01	6574+01	-9999.
23900	070	046	-78.6	3500+01	6266+01	-9999.
24000	074	043	-77.4	3320+01	5908+01	-9999.
24100	079	040	-75.9	3160+01	5580+01	-9999.
24200	082	038	-75.2	3000+01	5274+01	-9999.
24300	086	037	-74.2	2850+01	4989+01	-9999.
24400	089	035	-74.2	2710+01	4744+01	-9999.
24500	092	033	-74.8	2570+01	4513+01	-9999.
24600	096	031	-73.3	2450+01	4270+01	-9999.
24700	097	029	-72.2	2330+01	4038+01	-9999.
24800	099	028	-71.2	2210+01	3812+01	-9999.
24900	101	026	-69.7	2100+01	3595+01	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
25000	104	024	-68.2	.2000-01	.3399-01	-9999.
25100	108	022	-68.2	.1910-01	.3246-01	-9999.
25200	109	021	-68.2	.1820-01	.3093-01	-9999.
25300	111	019	-68.2	.1730-01	.2940-01	-9999.
25400	113	018	-68.2	.1640-01	.2787-01	-9999.
25500	114	016	-68.2	.1560-01	.2651-01	-9999.
25600	116	016	-68.2	.1490-01	.2532-01	-9999.
25700	119	015	-68.2	.1420-01	.2413-01	-9999.
25800	119	013	-67.2	.1350-01	.2283-01	-9999.
25900	121	012	-67.9	.1280-01	.2172-01	-9999.
26000	123	010	-69.4	.1220-01	.2066-01	-9999.
26100	124	009	-70.2	.1160-01	.1991-01	-9999.
26200	126	007	-70.2	.1110-01	.1905-01	-9999.
26300	128	006	-71.0	.1050-01	.1809-01	-9999.
26400	128	004	-72.5	.1000-01	.1736-01	-9999.
26500	128	003	-73.2	.9500-02	.1655-01	-9999.
26600	128	002	-73.5	.9000-02	.1571-01	-9999.
26700	126	001	-75.1	.8600-02	.1512-01	-9999.
26800	126	001	-76.6	.8200-02	.1453-01	-9999.
26900	126	001	-78.2	.7800-02	.1393-01	-9999.
27000	126	003	-79.6	.7400-02	.1332-01	-9999.
27100	120	359	-80.3	.7003-02	.1261-01	-9999.
27200	113	358	-81.0	.6627-02	.1193-01	-9999.
27300	107	357	-81.6	.6271-02	.1129-01	-9999.
27400	100	356	-82.3	.5934-02	.1068-01	-9999.
27500	094	354	-83.0	.5615-02	.1011-01	-9999.
27600	086	353	-83.7	.5314-02	.9566-02	-9999.
27700	081	351	-84.3	.5029-02	.9052-02	-9999.
27800	075	349	-85.0	.4759-02	.8566-02	-9999.
27900	069	347	-85.7	.4503-02	.8106-02	-9999.
28000	063	344	-86.3	.4261-02	.7671-02	-9999.
28100	058	341	-87.0	.4032-02	.7259-02	-9999.
28200	052	336	-87.7	.3816-02	.6869-02	-9999.
28300	047	331	-88.3	.3611-02	.6500-02	-9999.
28400	042	325	-89.0	.3417-02	.6151-02	-9999.
28500	036	318	-89.7	.3234-02	.5821-02	-9999.
28600	035	309	-90.3	.3060-02	.5509-02	-9999.
28900	036	296	-91.1	.2600-02	.4950-02	-9999.
29200	040	285	-91.9	.2200-02	.4220-02	-9999.
29500	044	276	-92.6	.1860-02	.3590-02	-9999.
29800	075	273	-91.5	.1600-02	.3050-02	-9999.
30100	114	271	-90.1	.1350-02	.2560-02	-9999.
30400	157	270	-88.6	.1190-02	.2190-02	-9999.
30700	204	270	-87.2	.9690-03	.1800-02	-9999.
31000	249	270	-85.8	.8210-03	.1510-02	-9999.
31300	277	269	-84.0	.6990-03	.1270-02	-9999.
31600	283	269	-81.8	.5990-03	.1070-02	-9999.
31900	282	269	-79.5	.5130-03	.9000-03	-9999.
32200	270	269	-77.3	.4400-03	.7630-03	-9999.
32500	245	269	-75.1	.3770-03	.6440-03	-9999.

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TABLE 5. (Concluded)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
326000	201	269	-72.8	.3230-03	.5440-03	-9999.
331000	204	269	-69.0	.2790-03	.4610-03	-9999.
334000	203	269	-65.2	.2420-03	.3910-03	-9999.
337000	195	268	-61.4	.2090-03	.3310-03	-9999.
340000	179	268	-57.6	.1810-03	.2810-03	-9999.
343000	149	267	-53.8	.1570-03	.2380-03	-9999.
346000	130	267	-48.6	.1370-03	.2030-03	-9999.
349000	131	267	-42.1	.1210-03	.1740-03	-9999.
352000	128	265	-35.6	.1070-03	.1490-03	-9999.
355000	120	264	-29.1	.9460-04	.1280-03	-9999.
358000	106	261	-22.6	.8350-04	.1090-03	-9999.
361000	084	262	-16.0	.7370-04	.9370-04	-9999.
364000	086	260	-6.2	.6680-04	.8160-04	-9999.
367000	086	257	3.5	.6050-04	.7110-04	-9999.
370000	084	253	13.2	.5470-04	.6190-04	-9999.
373000	081	247	23.0	.4940-04	.5390-04	-9999.
376000	077	239	32.7	.4450-04	.4690-04	-9999.
379000	064	248	43.1	.4050-04	.4110-04	-9999.
382000	063	245	54.2	.3720-04	.3630-04	-9999.
385000	062	241	65.7	.3420-04	.3220-04	-9999.
388000	062	238	77.4	.3160-04	.2860-04	-9999.
391000	062	234	89.4	.2920-04	.2560-04	-9999.
394000	062	230	101.6	.2710-04	.2290-04	-9999.
397000	063	226	114.1	.2520-04	.2050-04	-9999.
400000	064	222	126.6	.2350-04	.1850-04	-9999.

TABLE 6. STS-4 SRB DESCENT-IMPACT SURFACE SHIP OBSERVATIONS

Site: USN Ship, Gen. H. S. Vandenberg						
Location: 29°N Latitude 78°W Longitude						
Date: June 27, 1982						
Time: 1507 GMT						
Surface Observation:						
<u>Air Temp. °F</u>	<u>Wet-Bulb °F</u>	<u>Dew Pt. °F</u>	<u>Pressure (MSL) mb</u>	<u>Wind Dir.</u>	<u>Wind Sp. Kt.</u>	
86.5	78.8	76	1020.7 (60' station press. = 1018.9 mb)	210°	2	
Sky Observation:						
<u>Clouds</u>			<u>Total Sky Cover</u>	<u>Total Opaque Sky</u>	<u>Visibility (miles)</u>	
2/10 Cumulus at 1,500 ft 2/10 Thin Cirrus at 30,000 ft			4/10	2/10	7 (Dense Haze Aloft)	
Sea Observation:						
<u>Sea Condition</u>		<u>Wind Waves</u>		<u>Swell Conditions</u>		
Sea Calm - Code 1		Freq. Sec.		Ht. m.		
0/10 Breaking Waves		5		Data Not Available		
0/10 Foam						
Surface Sea Water Temp = 28.9°C (84.0°F)						

TABLE 7. SELECTED ATMOSPHERIC OBSERVATIONS FOR THE FLIGHT TESTS OF
THE SPACE SHUTTLE VEHICLES

Vehicle Data					Surface Observations				Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meteorological Significance	
Seq. No.	Vehicle No.	Launch Date	Time ^c (EST) Nearest Minute	Launch Pad	Thermodynamic ^a			Wind ^b					
					Press ^d N/cm ²	Temp. (°C)	Rel. Hum. (%)	Speed (ft/sec)	Dir. (deg)	Alt. (ft)	Speed (ft/sec)		Dir. (deg)
1	STS-1	4/12/81	0700	39A	10.234 ^e	21	82	11.8 15.2	125 120	44,300	98	250	Wind directional change observed at Pad just prior to L+0.8
2	STS-2	11/12/81	1010	39A	10.166	23	61	27.0 27.0	345 355	36,300	158	286	
3	STS-3	3/22/82	1100	39A	10.160	24	71	7.0 ^f 8.0 ^f	50 ^f 145 ^f	45,000	119	250	
4	STS-4	6/27/82	1100 ^h	39A	10.200	29	70	5.5 ⁱ 4.9 ⁱ	133 ⁱ 141 ⁱ	47,900	37	329	

a. Pad 39A thermodynamic measurements taken at approximately 1.2 m (4 ft) above natural grade at camera site No. 3.

b. 1 min average prior to L+0 of 60 ft PLP (listed first) and 275 ft FSS winds measured above natural grade.

c. Eastern Standard Time unless otherwise noted.

d. Pressure measurement applicable to 21 ft above MSL unless otherwise indicated.

e. Pressure measurement applicable to 14 ft above MSL.

f. 10 sec average prior to L+0.

g. Due to onset of sea breeze.

h. Eastern Daylight Time

i. 30 sec average prior to L+0.

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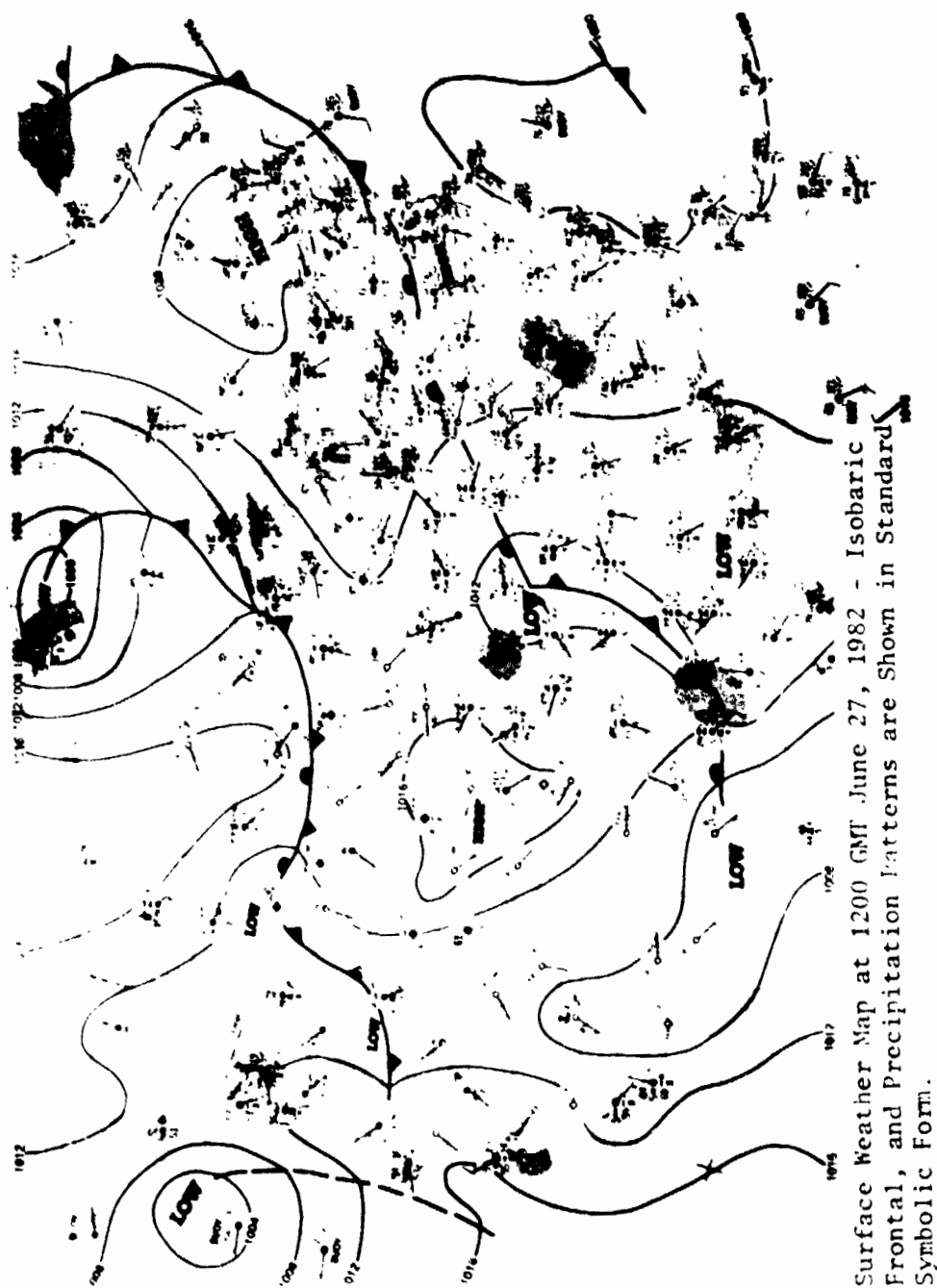


Figure 1. Surface weather map 3 hr prior to launch of STS-4.

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500 Millibar Height
Contours at 1200 GMT
June 27, 1982.
Continuous Lines Indicate Height Contours In
Feet Above Sea Level. Dashed Lines are Isotherms
In Degrees Centigrade. Arrows Show Wind Direction
and Speed at the 500 MB Level.

Figure 2. 500 mb map 3 hr prior to launch of STS-4.

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Figure 3. GOES SMS-II visible imagery of cloud cover 30 min after launch of STS-4 (1530 GMT, June 27, 1982). 500-mb contours and wind barbs are also included for 1200Z.

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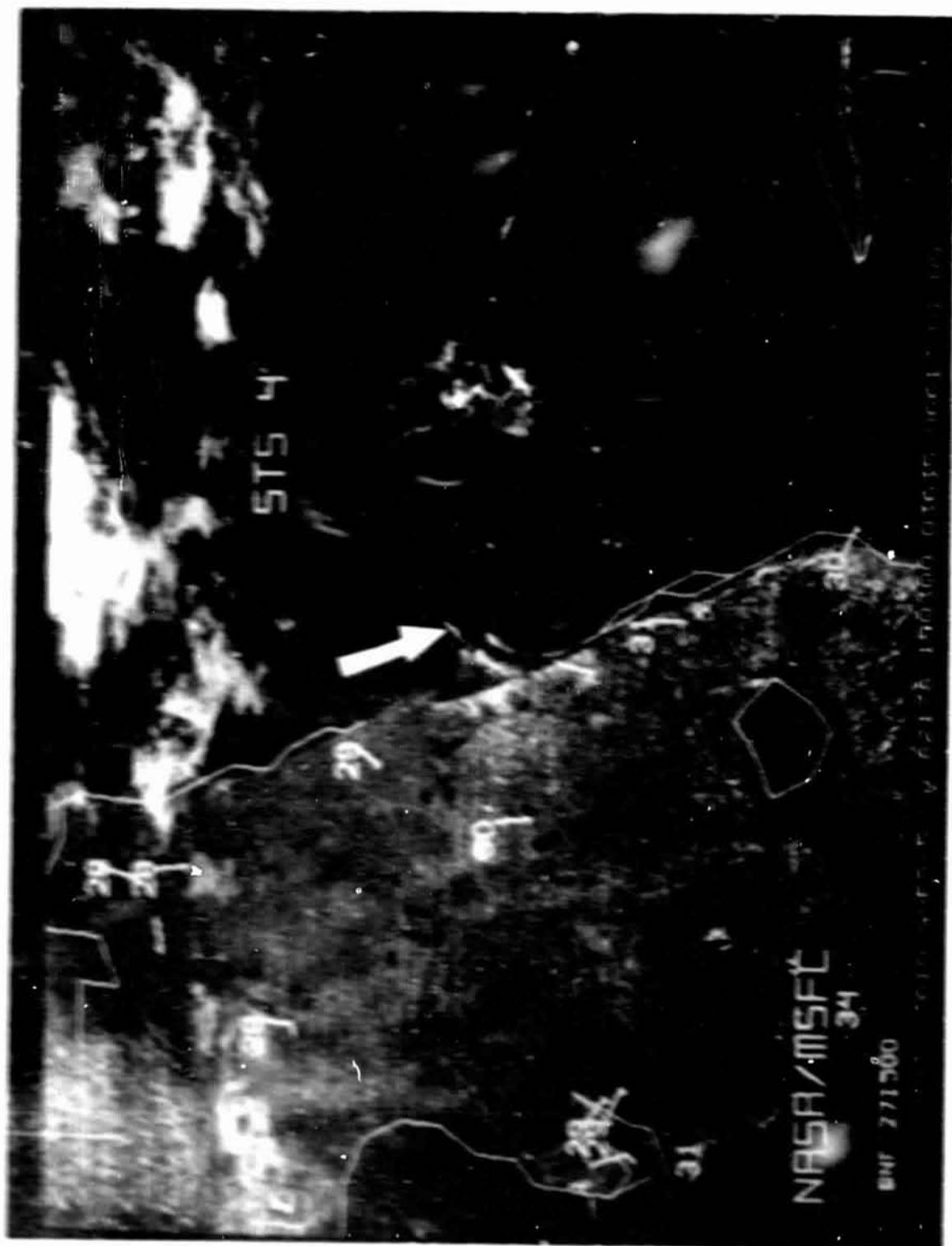


Figure 4. Enlarged view of GOES SMS II visible imagery of cloud cover with exhaust trail visible (indicated by arrow) 3 min. after launch of STS 4 (1503 GMT, June 27, 1982). Surface temperatures and wind barbs for 1500 GMT are also included.

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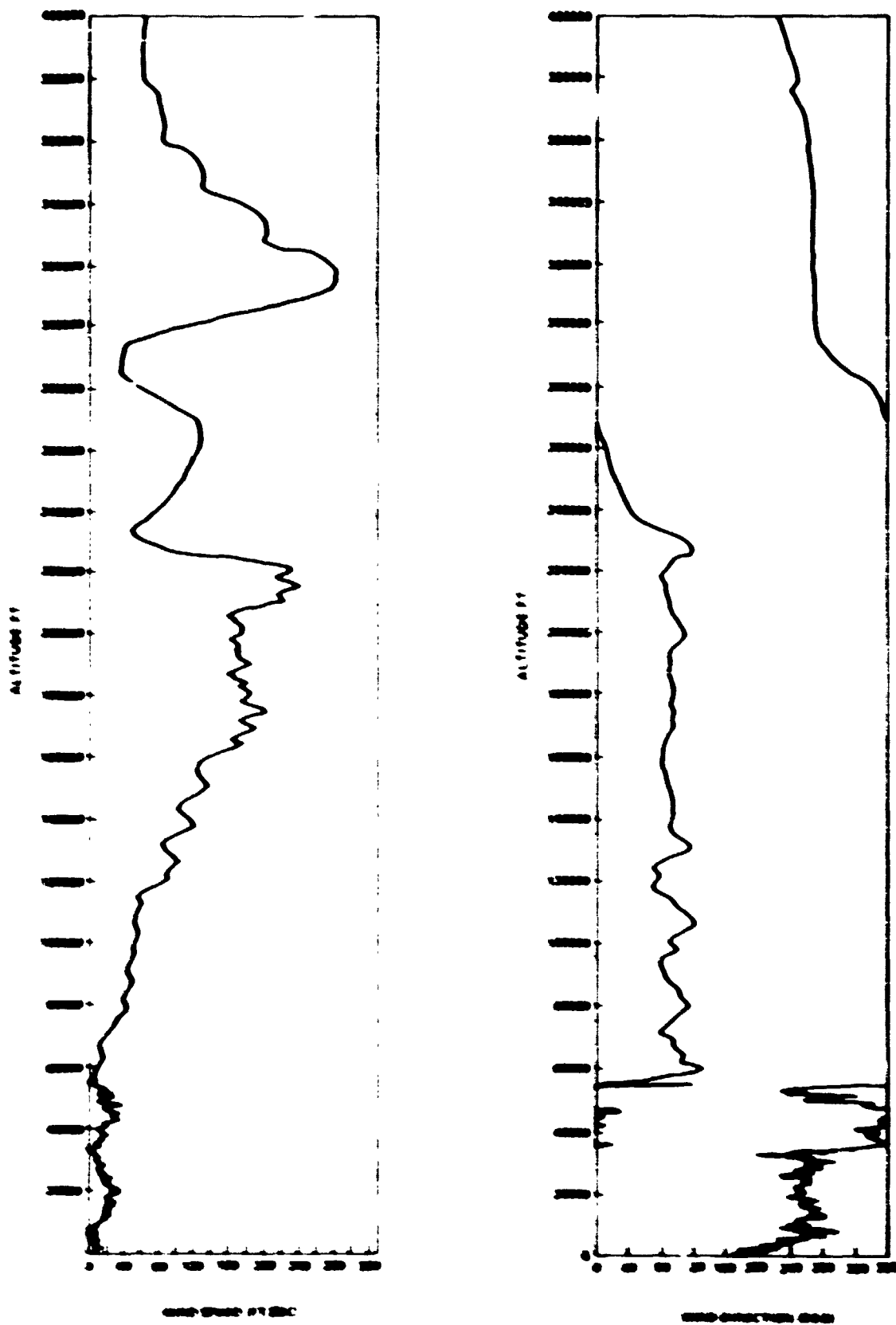


Figure 5. Scalar wind speed and direction at launch time of STS 4.

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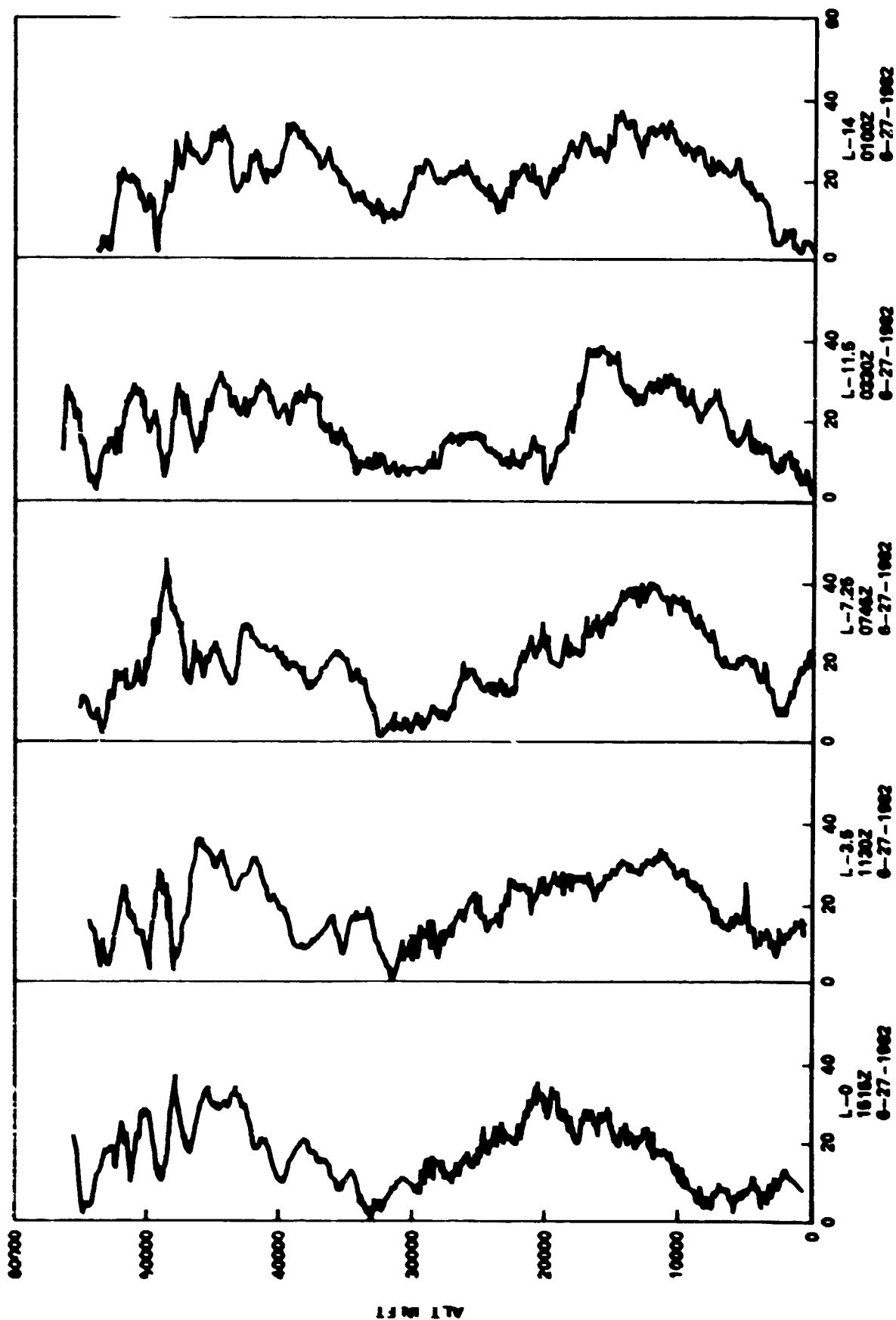
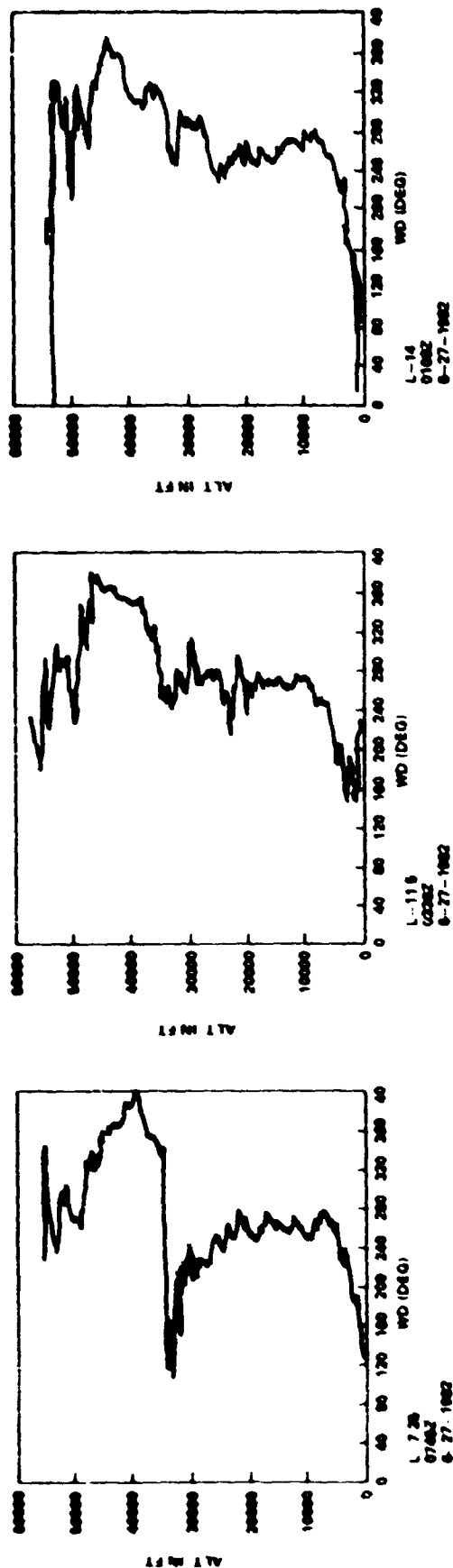


Figure 6. STS-4 prelaunch/launch Jimsphere-measured wind speeds (FPS).



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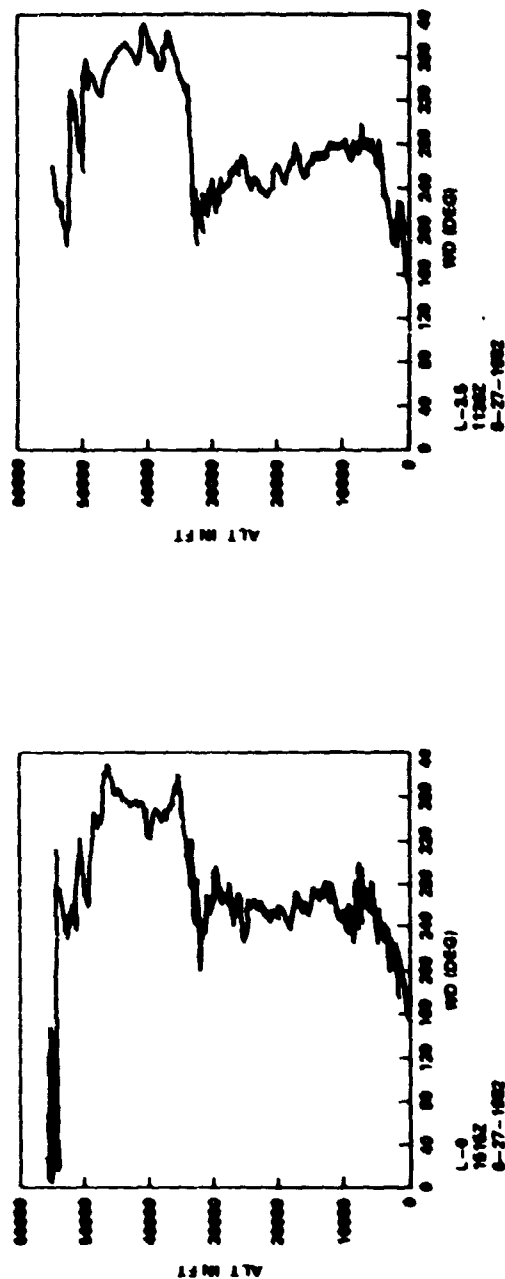


Figure 7. STS-4 prelaunch/launch Jimsphere-measured
wind directions (degrees).

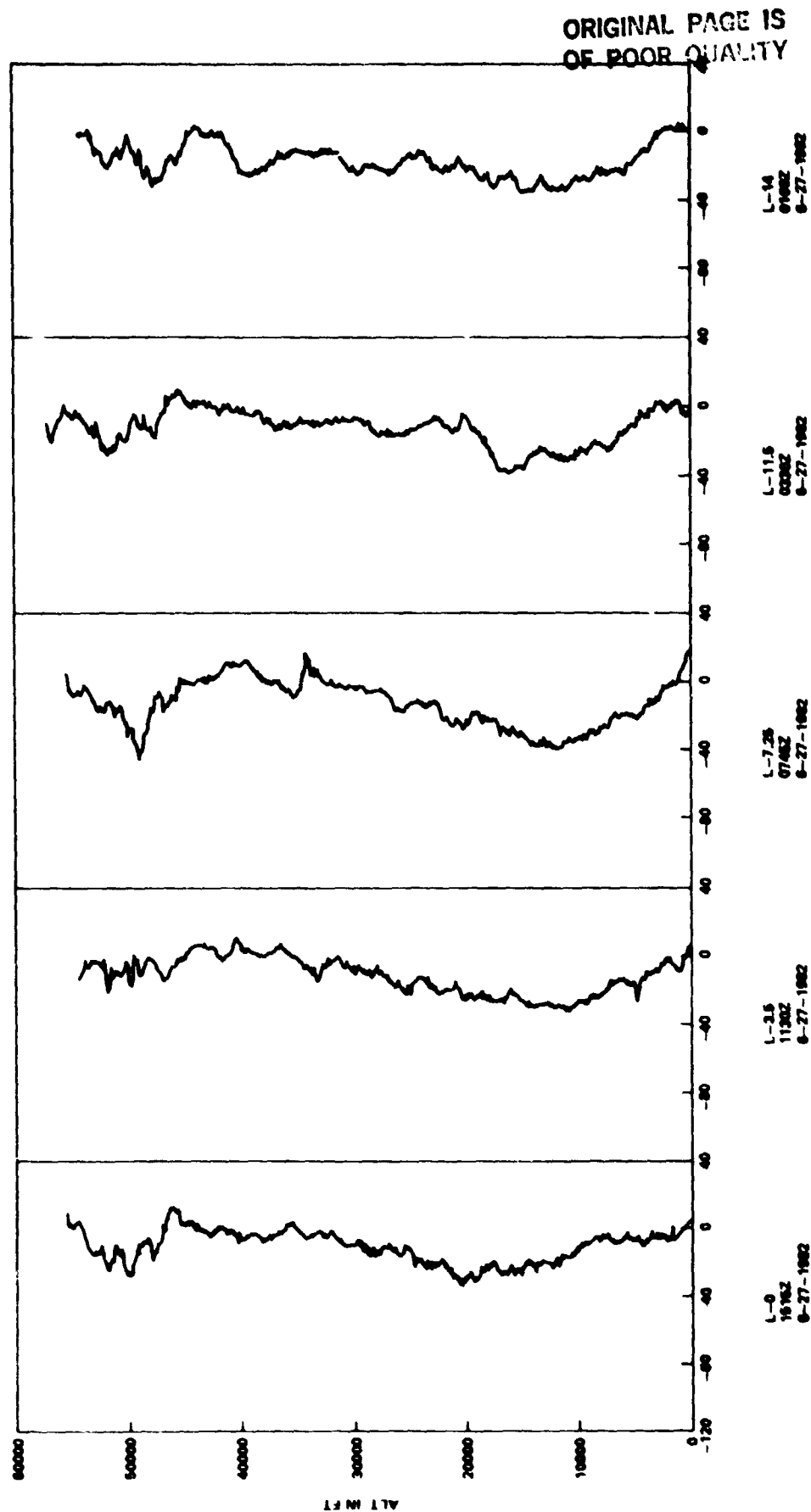


Figure 8. STS-4 prelaunch/launch Jimsphere-measured in-plane component winds (FPS). Flight azimuth = 90 degrees.

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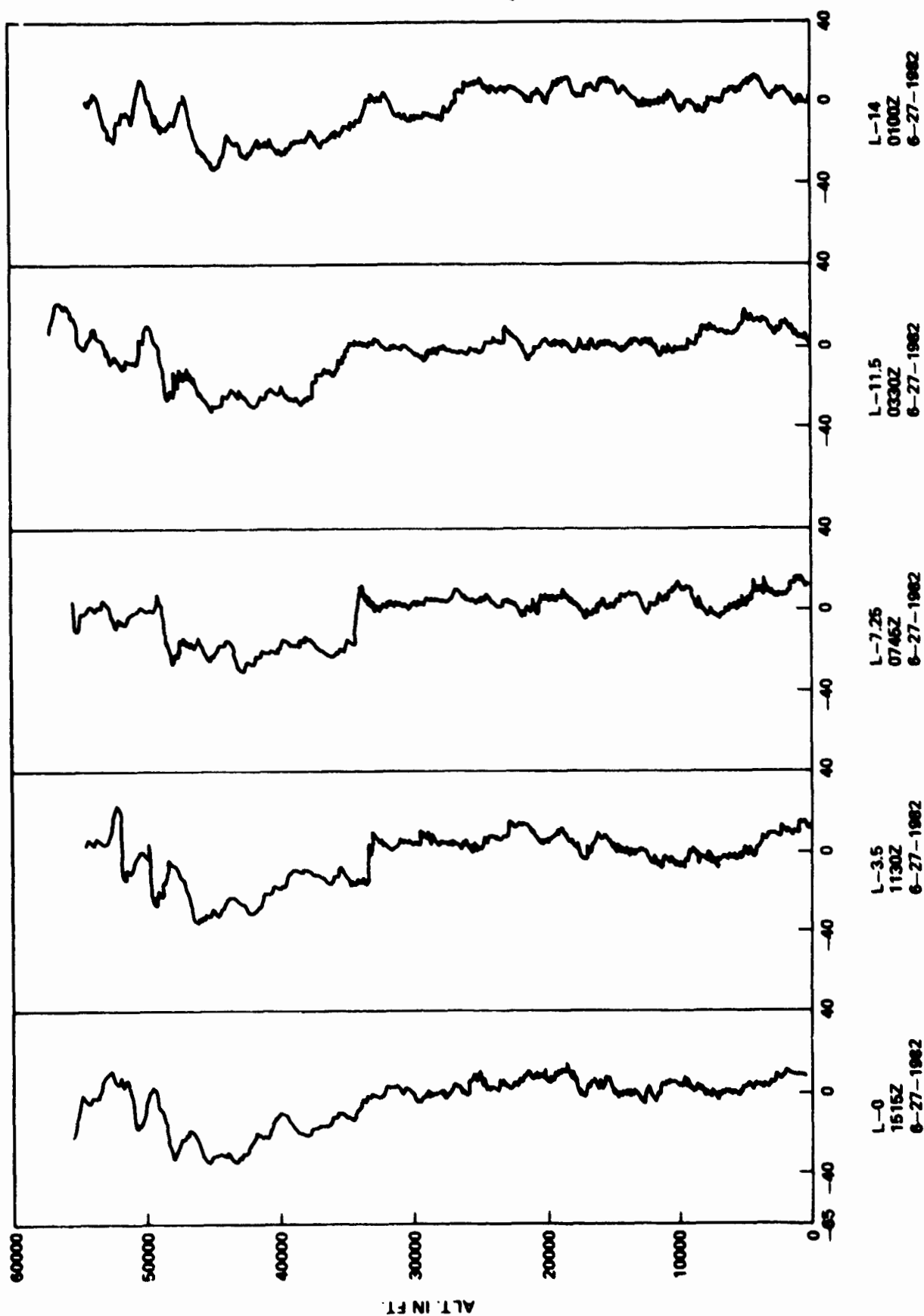
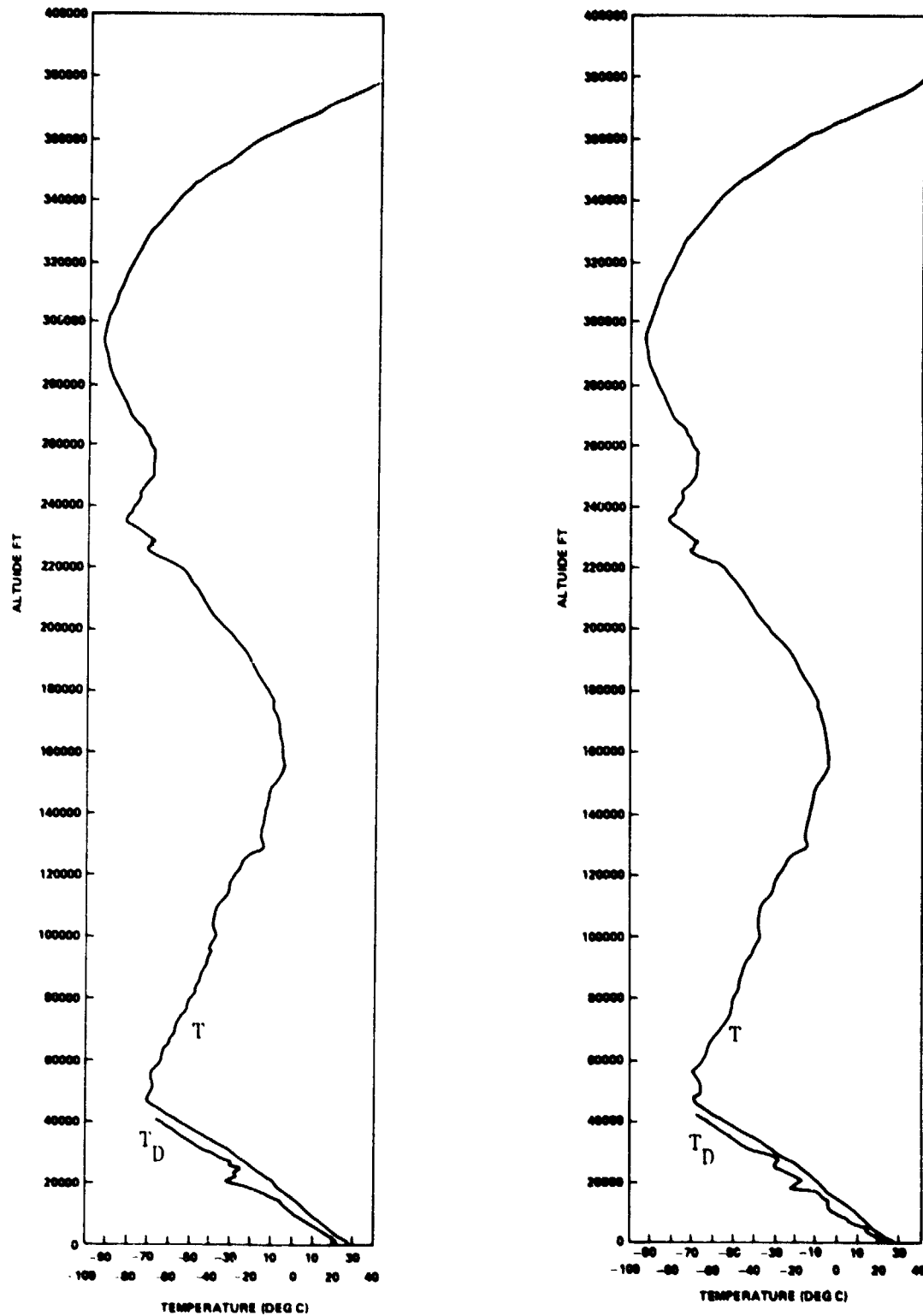


Figure 9. STS-4 prelaunch/launch Jimsphere-measured out-of-plane component winds (FPS). Flight azimuth= 90 degrees.

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T_D Dew point temperature
T Temperature

Figure 10. STS-4 temperature profiles versus altitude for launch (left) and SRB descent (right).

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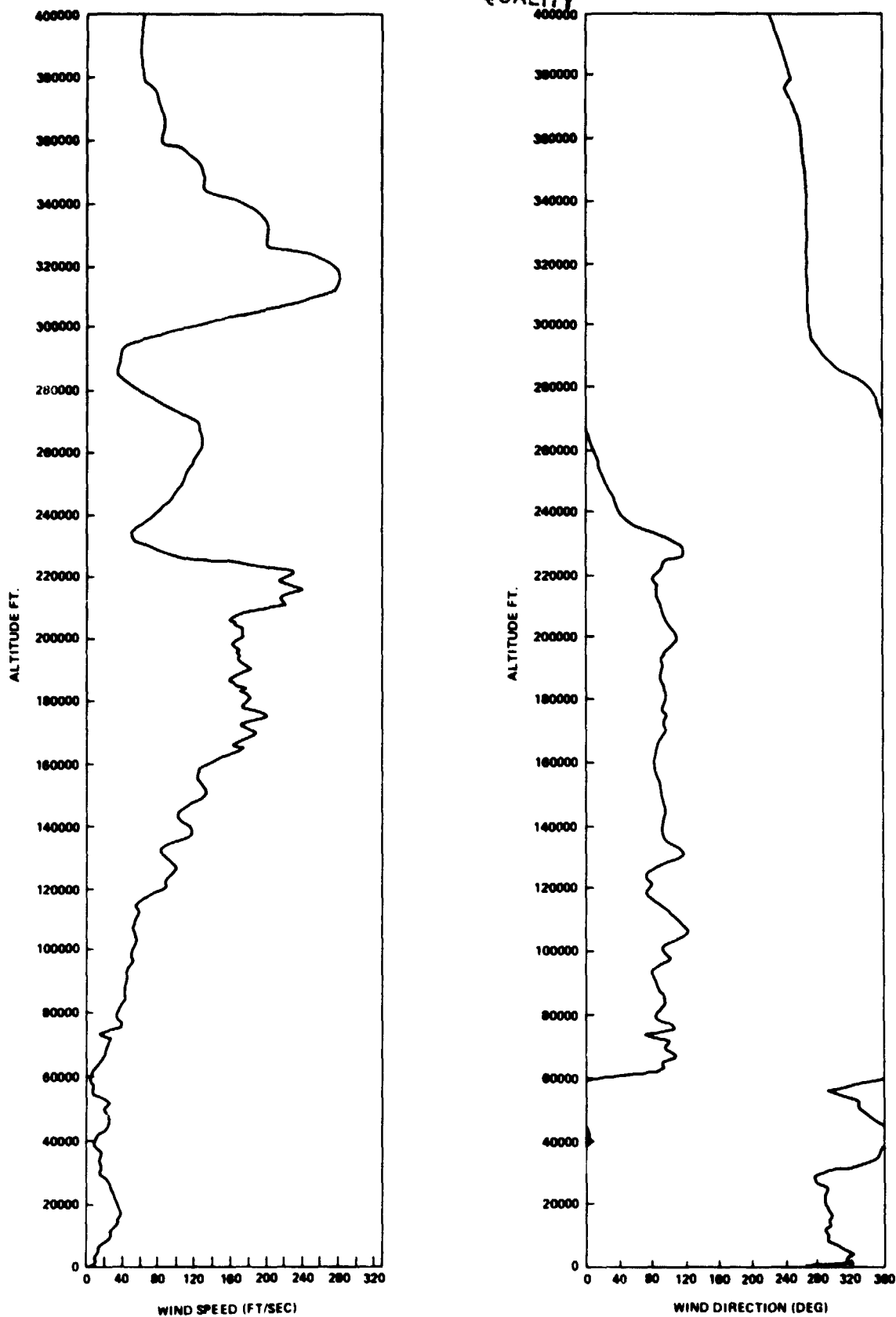


Figure 11. STS 4 scalar wind speed and direction for SRB descent.

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